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The
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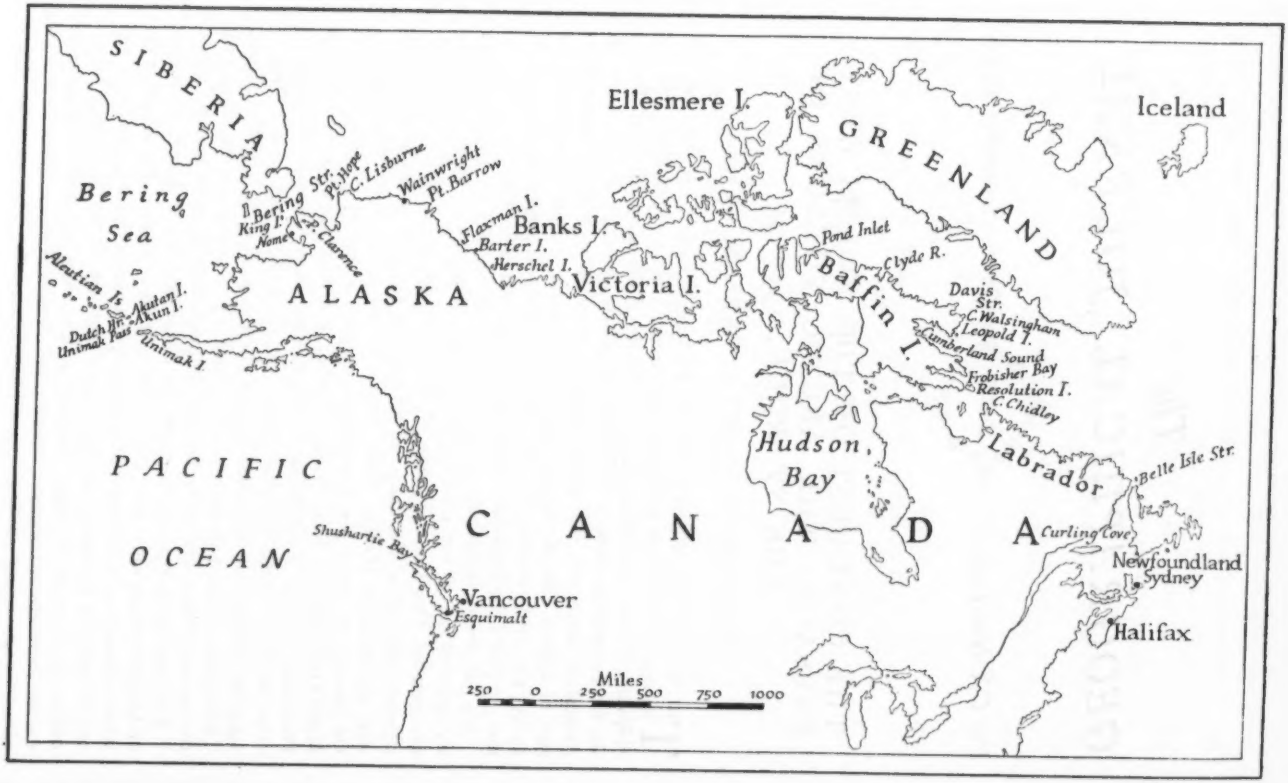
THE CONQUEST OF THE NORTH WEST PASSAGE: THE ARCTIC VOYAGES OF THE *ST. ROCH*, 1940–44

INSPECTOR HENRY A. LARSEN, R.C.M.P.

THE R.C.M.P. *St. Roch* has had an interesting career, spending all her summers and eleven winters in the Arctic. Built in 1928 at the Burrard Shipyard, North Vancouver, B.C., for the Royal Canadian Mounted Police, she has extra thick timbers of Douglas Fir sheeted on the entire outside with Australian Gumwood, sometimes called Ironbark, to resist the grinding pressure of icefloes. She is 104 feet long, with a beam of 25 feet and a draft of 13 feet when fully loaded. Diesel powered, she was assigned, with her crew of nine, to patrol the Canadian Arctic and to winter in remote places.

We had already spent nine winters in the North when in the spring of 1940 we received one of our most important and, to my mind, most interesting assignments. Our Commissioner, S. T. Wood, informed us that when our regular duties along the Canadian Western Arctic coast were completed, we were to proceed to Halifax, Nova Scotia, by way of the North West Passage. On this trip we chose the Southern route: that is, eastward through Queen Maud Gulf, south of King William Island, then northward between Boothia Peninsula and the King William Island coast (map following p. 144). In other words, we used the same route that Amundsen took in the *Gjöa* in 1903–06, except that we passed through Bellot Strait instead of Peel Sound. This voyage, which took twenty-eight months, gave us the opportunity to visit the remote Eskimo groups on Boothia Peninsula and the surrounding district.

The summer of 1943 was spent in the Canadian Eastern Arctic. Returning on October 16 the same year, after a patrol of about 8000 miles, we spent the winter of 1943–44 at Halifax undergoing repairs and having a 300 horse-power engine installed in place of our 150 to give more power for the coming voyage during the summer of 1944. Our instructions were to return to Vancouver *via* the Northern or Lancaster Sound route. This had never before been completed by any vessel, although many had tried in vain. The last to attempt it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Resolution I.
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Akun I.
Dutch Hr.
Unimak Pass
Unimak I.
Hudson Bay
Labrador
Belle Isle Str.
PACIFIC
OCEAN
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CANADA
Curling Cove
Newfoundland
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was the C.G.S. *Arctic* under Captain Bernier in 1910. Captain Bernier reached a point a little beyond Winter Harbour on Melville Island from where he was forced to return to Montreal.

After our overhaul in Halifax was completed, we left on July 22, making a three-day stop at Sydney, N.S., for a last check-up. Finally we got under way, carried out our programme, and arrived in Vancouver, B.C., on 16 October 1944. Thus we became the only vessel to complete the Northern route both ways and the only vessel to complete the Lancaster Sound route, the better of the two and the route which will be used in future.

The outward voyage, 1940–42

After loading our little vessel to full capacity with fuel and provisions for our own needs as well as for our Western Arctic detachments, we left Vancouver at 2.50 a.m., 23 June 1940, and proceeded northward through the inside passage as far as the north end of Vancouver Island. From this point we headed *St. Roch's* blunt bow westward across the Pacific direct for Unimak Pass. Here we met with some bad weather and at times our heavily laden vessel was almost completely submerged, large volumes of water pouring down into our living quarters. On July 4 we passed through Unimak Pass from the Pacific into the Bering Sea and on July 6 arrived in Dutch Harbour.

Next day, Sunday, we were royally entertained by the officers and crew of the U.S. Coast Guard Cutter *Shoshone* of the Bering Sea Patrol. Some of them were, I think, rather amused at our small vessel with its decks buried under hundreds of coal sacks, oil drums, and small row boats, stacks of cases of fresh potatoes, eggs, and various vegetables that we could not store in our holds. And on top of this deck-load were our men in their Mounted Police uniforms trying to act and walk in a dignified and military manner as laid down in our training manuals. However, friendly relations were soon established between our men and the American sailors who began to swarm aboard the *St. Roch* and to entertain us with tales they had heard or read in the States of the exploits of the R.C.M. Police.

On July 9 we said goodbye to our friends and headed northward and on the 15th we entered the Harbour of Teller, sometimes called Port Clarence, a small settlement about 80 miles north of Nome. It was here that Amundsen landed with his airship *Norge* in 1926 after crossing over the Pole from Spitsbergen. We called to pick up dried fish for dog-feed as well as to give our engines a check-over before getting into the icepack. Leaving Teller on July 16 we ran into some very dirty weather in Bering Straits, through which we passed without a glimpse of land. Thick weather and strong southerly winds prevailed and the next land we picked up and recognized was Cape Lisburne. We could expect the ice anytime now. As we were all in need of some rest and the weather was still bad with thick fogbanks, I decided to anchor for a while at Point Hope, a long sandspit projecting about 15 miles from the mainland into the sea. On the point itself there is a settlement of about three hundred Eskimos and a residential school teacher with his family.

In recent years the Smithsonian Institute and the University of Alaska have done a lot of research and excavation on the sandspit of Point Hope. Many fine ivory carvings, ornamental and otherwise, were found as well as tools and

weapons and hunting implements, many made of green and black jade. People were living there well over a thousand years ago—a people who made their living from the sea and even then hunted whales and walrus. Possibly they were the ancestors of the present inhabitants but they must have been much further advanced in their day, judging by the carvings and implements I saw.

On July 22 we arrived and anchored off Cape Smyth. This is a large settlement usually known as Point Barrow, with a population of about five hundred Eskimos. There is a hospital, a church, and a large school which is in the care of the U.S. Bureau of Education. We paid a short visit ashore and were heartily welcomed in the traditional manner of American hospitality. The most outstanding character in this place was Old Charlie Brower, a resident of these parts for over fifty years. He was known all over Alaska as "King of the Arctic" and shortly before his death in 1945 he wrote a book called 'Fifty years below zero.'

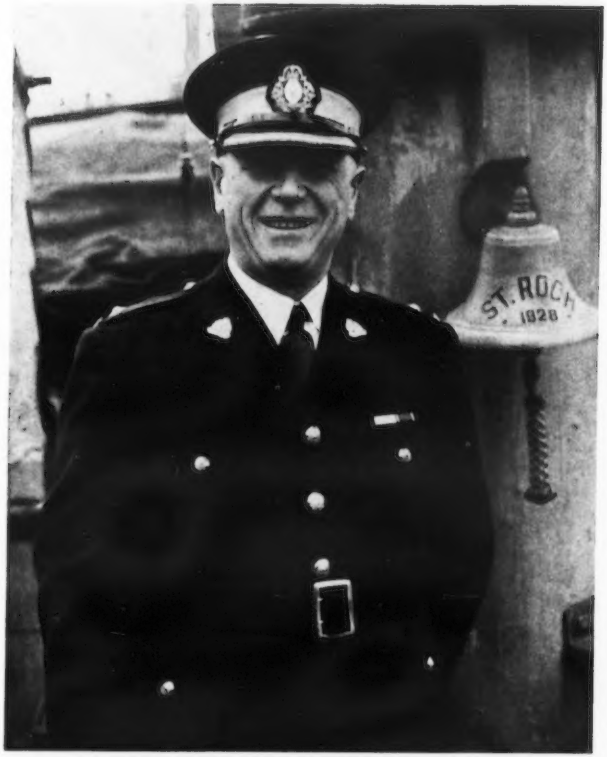
As the anchorage at Cape Smyth was dangerous so early in the season we did not linger but pushed on 12 miles north-east to round Point Barrow itself. This is a long narrow point extending into the Arctic Ocean where northerly and westerly winds cause the ice to jam up against it. It is dangerous for a vessel to remain on the west side of the Point when the ice is close. Many vessels have in previous years been caught here and have been either crushed or carried off with the ice. We were fortunate for there was a little water between the grounded ice and we rounded the Point at 3.30 p.m. on July 23. Around the Point conditions were a little better, since the land takes an east-south-east direction and so allows the ice a freer movement, except when there are north winds which force it in along the shallow coastline.

The year 1940 was bad for heavy ice, with prevailing northerly and north-westerly winds, and we were continually beset. It took us from July 23 to August 12 to make the 400 miles between Point Barrow and Herschel Island. Sometimes there was not a drop of water in sight as the ice packed itself tightly round us. At other times we were free to move about in little pools from which there was no outlet. At all times we had to be on the move to avoid damage, often moving only a shiplength or two. Sometimes we used "black gunpowder" to crack particularly nasty floes threatening our rudder and propeller.

After visiting Herschel Island, Port Brabant, and Coppermine, we proceeded to Cambridge Bay in the eastern part of Victoria Island. It was September 10 before we were ready to leave there. Our plan was to winter at Banks Island or Walker Bay on the west side of Victoria Island. Failing to find a suitable harbour for our vessel on Banks Island, we continued across Prince of Wales Strait to Walker Bay, arriving on September 25. It was now nearly freeze-up time, so we had to be busy setting nets in the lakes, already frozen, and hunting seals for dog-feed.

Before winter set in we had to cover the ship with a canvas awning to keep out the fine drifting snow that finds its way during a heavy blow through the thinnest cracks in the doors. When the ice on the lakes was about 12 inches thick we cut our water supply for the winter. Generally we chose a lake with deep water and an approach fairly free from rocks so that we could use our dogs to haul the ice back to the ship. All hands set to with large ice saws

Beset by ice in Franklin Strait, August 1942



Inspector Henry A. Larsen, R.C.M.P.

Inspector Henry H. Larsen, R.C.M.P.

and we cut perhaps 40 tons of ice to ensure a sufficient water supply for the winter. Every drop of water used must be melted. In our living quarters we stowed away forty-five gallon drums filled with crushed ice. On the stoves there were kettles of constantly boiling water which we poured over the ice. This performance went on every day.

We then started preparing for our journeys to Banks Island. The dogs were broken in and the steel runners on our large 16–18 feet sledge were given a covering a mud which was later smoothed and polished, a piece of bearskin being used to apply a thin coat of ice to the mud. This is the Eskimo method of making the sledges pull with a minimum of friction, for steel pulls hard over frosty snow. When we leave on patrol we often have 1500 lb. on our sledge pulled by eleven dogs. Of course there is not much riding as one has constantly to watch the sledges. During fairly good going we can cover 30–40 miles per day. We also adopted Eskimo clothing of Caribou skin, using double outfits in really cold weather with the inside fur next to the body. If the going gets hard the outer garment can be removed and a snowshirt, made of cotton drill or grenfell cloth, put on. We never carry a tent during the winter because of the extra weight; our camps every night are made of snow. For building our snowhouses we carry long snow or butcher knives, and these are among the essential equipment on a sled trip. For sleeping gear we use the Woods Arctic Sleeping Robe, or sometimes Caribou skin bags if we can get them; they are light and less bulky than the robes.

For cooking we use Swedish Primus stoves; a finer implement for arctic travellers has, I think, never been invented. It burns paraffin, is very economical, and seldom goes out of order even with the abuse they get. We have so far never had the opportunity to try any of the special food packages put up for the Army, Air Force, or other expeditions to the Arctic during the last few years. The food taken on our patrols was therefore prepared by the men themselves before setting out, from the ordinary supplies issued to us. Beans are always in great demand. We generally cook a 5-gallon pot and put in plenty of fine cut bacon, canned meat (fresh if we have it), canned tomatoes, onions, molasses, sugar, mustard, and salt. These are boiled until very thick and require constant stirring. When done they are ladled out in large pans and allowed to freeze, after which they are broken up with an axe into small chunks and placed in small canvas bags for easy carrying and handling. As a variation we also boil rice, potatoes, other vegetables, and meat; these are all put through the meat grinder after cooking and worked together in a large bread-pan or boiler. Instead of water for moisture, lots of canned soup or tomatoes are used, spices added, and the whole made into little flat patties which are frozen and also put away in canvas bags. When making camp we can have a meal in a few minutes by placing a few beans or some of the patties in a pot and adding a little water. Instead of the pilot bread or hard-tack, which takes up too much space and does not give great satisfaction to a hungry traveller, we cook hundreds of doughnuts. They are also, of course, frozen and put in bags. While the tea or coffee is brewing, a few are placed on top of the lid to thaw a little so that they can be chewed although they are never soft. Rolled oats are light to carry, and a big pot is generally cooked for breakfast. Besides these, we take dried onions and carrots

and some rice, as there is always the opportunity to pick up game on the way, so that a good stew can be made. We also saw frozen fish into slices about an inch thick; a slice of this is generally eaten as soon as the camp is made while we are waiting for the snow to melt for water. This raw frozen fish gives one a warm feeling of well-being after a few minutes. The Eskimos say that the frozen fish forces the warm blood from the inside out to the skin and makes one feel warm. This sounds reasonable to me and I have proved it many times. We also pack a small bag of flour and baking powder. When forced to lie over as we sometimes are during bad weather, we have lots of time to make a few bannocks or pancakes. These we cook mostly in beef tallow which we find better than lard.

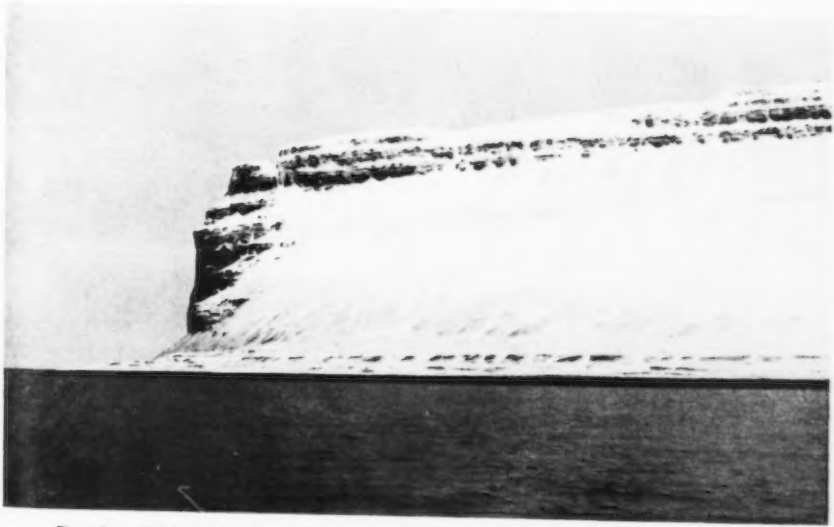
For our dogs we carry dried fish and seal blubber cut in squares ready to be swallowed. The blubber is stowed in cans so as not to make a mess of our gear. If short of blubber we pack beef tallow, for they must have fat with the dried fish. Fresh fish, or what we call greenfish, is too heavy to pack on long patrols.

To continue with the voyage; we remained frozen in at Walker Bay from 25 September 1940 until 31 July 1941 when the ice allowed us to move out. Proceeding southward, we called at Holman Island to pick up a young Eskimo boy accidentally shot through the cheeks by his brother with a ·22 calibre rifle, and carried him to Tuktoyaktok, "the place where deer cross," where he could get transportation to Aklavik for medical attention. At Tuk, we picked up the supplies which had arrived *via* the Mackenzie River, some for ourselves and some for the Coppermine and Cambridge Bay detachments.

Our work here finished, we left Cambridge Bay on 20 August 1941 and arrived at Gjöa Haven, King William Island, on August 27. That summer also proved bad with ice and violent snow squalls. When we reached Matty Island the ice was solid from shore to shore and more was driven down MacClintock Channel by prevailing north-west gales. There we nearly lost the ship, for the waters were full of shoals and the force of the wind and snow in our faces made it impossible to see. We dropped both anchors behind a reef and prayed that they would hold, which they did, although great floes crashed down on us all night. By September 3 we had worked up to Pasley Bay in the vicinity of the North Magnetic Pole. There we got caught in the ice and drifted back and forth with it until September 11 when we were jammed in close to the beach and all ice in the bay became stationary until 4 August 1942.

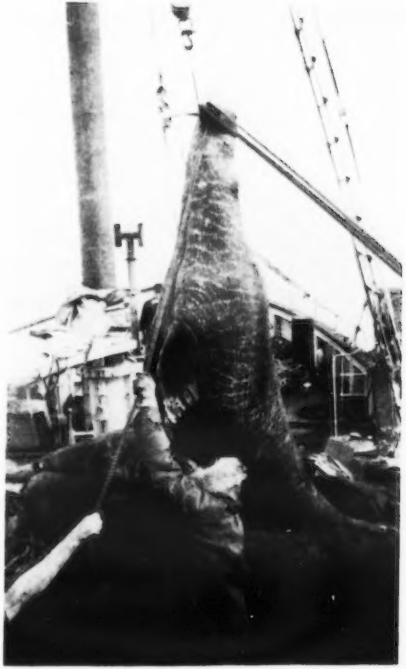
That day we moved out of the bay about 15 miles. There we again got locked in, drifting back and forth near where Sir John Franklin's ships, the *Erebus* and *Terror*, were beset and abandoned nearly one hundred years before. On August 24 a small lead opened and we worked our way up to the Tasmania Islands where we remained close to the beach until the 29th. There was a little open water between these islands and the loose ice moved in and out at terrific speed with the change of the tides in the deep, narrow channels, keeping us all awake. We had to be constantly on the move to avoid damage or being pushed ashore. On the 29th we were able to proceed northward by heading for Prince of Wales Island which we followed up until abeam of Bellot Strait. We cut across and entered the Strait the same night. The western end was

"St. Roch" in Pasley Bay, Boothia peninsula, August 1942



Beechey Island from "St. Roch" anchorage in Erebus Bay, August 1944

Polar bear on an ice floe



Seal meat for men and dogs

Fishing under the ice at Tree River

clear of ice but in the middle there was a barrier right across, held there by some heavy grounded ice. The Strait is about 18 miles long and only half a mile wide, and a fast current runs through it. As the ice came pouring in behind us we could do nothing but crash into it and attempt to drift through. This we did, the strong current causing large whirlpools in which cakes of ice gyrated. Many times we thought the ship would crack like a nut under the pressure. Sometimes we became stationary off points of land—high, dark, inaccessible cliffs projecting into the Strait.

We had two young Eskimos aboard, a man and his wife. When things looked really bad they would go up on the forecastle head and sing at the tops of their voices. They told me they were singing so that the ship would not get crushed, so I told them to keep on singing. They were pleased when we got through and I told them their singing had helped. Meanwhile, the people at the Hudson's Bay Company post Fort Ross at the eastern end of the Strait had anxiously watched our struggles and they all came swarming aboard to welcome us.

We now considered our voyage practically over, as the Hudson's Bay Company ship *Nascopie* has called here regularly every year since 1937. But it so happened that in 1942 it did not reach Fort Ross because of the ice pouring into Prince Regent Inlet after we had left. On September 2 we proceeded to Pond Inlet, Baffin Island, where we have a detachment, picked up one of our men due to go out, and proceeded southward on September 10. In Davis Strait we ran into a strong south-east gale with snow squalls and no visibility. The sea was studded with small icebergs and "growlers," as the small, almost submerged icebergs are called, some disappearing in the swell, then bobbing up again like gigantic sea-monsters. With our low power it was hard to dodge them and the suction seemed to drag us towards them. One struck us and knocked a piece off our hardwood guard rail. Had it struck lower down it would have gone right through the bottom. We finally arrived at Halifax on October 11 and our voyage was over.

Whilst frozen in at Pasley Bay we made many patrols to get acquainted with the country and to visit and take census of the Eskimos scattered in small groups along the coast of Boothia Peninsula and Somerset Island. One of our trips took us to Victoria Harbour in Thom Bay on the east side of Boothia. It is the largest Eskimo settlement on that coast. The people live almost as they did in 1829 when Sir John Ross arrived there in his ship *Victory* in search of the North West Passage. After three winters spent in vain attempts to extricate his vessel from the ice, Ross abandoned her in the spring of 1832. We visited the place and found large pieces of iron plates and bolts from his little steam boiler and engine, and coils of old hemp rope. There was an old bronze cannon there which it almost broke my heart to leave behind, but it was too heavy to pull on our sledge. The Eskimos all had implements and seal-oil lamps made from the iron plates from the boiler. The older people still vividly describe the men on the *Victory* from the tales handed down to them by their forefathers; the ship itself, they said, had finally drifted out of the harbour and smashed up and sunk near one of the many islands in Lord Mayor Bay.

One cannot but like and admire the Eskimos, especially the most primitive

groups among them, for their helpfulness to one another, their resourcefulness in hard times, and their fondness for children. Wherever we arrived we were most heartily welcomed. They gave us the choicest titbits of seal meat, fish, or anything that might happen to be simmering in their pots, hanging over the blubber lamps. Some pots contained the heads of large bearded seals with long drooping moustaches and large mournful eyes. An old wrinkled woman would put her hand in a pot, search around for a while, then pull out a choice piece of meat, squeeze it between her fingers and give it a few licks with her tongue; then, with a gracious smile, she would hand it to us. Not to ignore this friendly gesture, we would pull out our knives, cut off a few pieces of meat, and toss the remainder back into the pot.

Whence the Eskimos came no one will perhaps ever know with certainty. Their old legends, beliefs, and customs are dying out fast; the bringers of civilization have been too busy teaching them our ways of living to find out much about these people. The ones we came in contact with, from Bering Strait to Hudson Bay, seemed to differ somewhat in appearance from one locality to another, although their language is universally the same except for local dialects. The ones nearest in physical appearance, it seems to me, are those farthest apart geographically. For example, the Eskimos of the Alaskan coast look very much like those of Baffin Island and their dialects are almost identical. An Eskimo family we took with us from Baffin Island to Herschel Island expressed surprise that it was much easier for them to converse with the Western or Mackenzie Eskimos than with their immediate neighbours across Prince Regent Inlet and King William Island. The Eskimos living in the Coronation Gulf area, in Bathurst Inlet, and Victoria Island as far east as Cambridge Bay appear to be taller, with better features, some very ruddy and of a generally more handsome appearance than either the Alaskans or Baffinlanders.

The Eskimos who have the hardest life are probably the few scattered groups living around the Boothia and Adelaide Peninsulas and in the King William Island region. They are also the most primitive. Owing to the scarcity of caribou on which they depend for clothing, they seem nearly always to be ragged and dirty. In the spring and summer they mostly go inland in search of deer, returning again to the sea-ice in the fall in order to hunt seals, their main source of food and fuel during the long winter. Some years when they have failed in the deer hunt one can find them huddled together in miserable little snow huts, just eking out an existence, waiting for spring. The best of the clothing, in many cases the sleeping skins, have to be made over for the men so that they can stay out on the ice to spear seals at the breathing holes or jig for tom cods—a small species of codfish, hardly more than a head with a tail attached. The women and children have to stay around the snow-houses, sometimes clothed only in dirty old deerskin rags, many with parts of their bodies exposed. Under such conditions they cannot travel very far in search of better hunting. Whatever game is secured is divided by the wife of the lucky hunter and given to the other women in camp. They all share alike and seem not to keep anything extra for themselves; all are free to visit each other's snowhouses and to help themselves to any food or meat lying around. Sometimes they congregate in one snowhouse to eat, and so the

precious seal blubber used to cook the meat is conserved. In hard times, some of the very old and infirm commit suicide in order not to impose on the younger and abler hunters. I have never heard of anyone being deliberately "put out of the way" although there have been many rumours of it; but these, I think, come mostly from people who have never been in close contact with Eskimos or seen the conditions under which some of them exist.

I know of one old Eskimo who committed suicide. This man, a great hunter in his day, strangled himself—this seems to be the most usual way—a few days before my arrival. It was during the bad winter of 1937 and took place on the ice a few miles eastward from King William Island. His wife and relatives told me that he had been ailing for nearly a year and had lost the use of his legs. The other men used to pull him out by sledge to the seal holes, where he would sit for hours poised over a hole, waiting to strike a seal. Sometimes he succeeded, but he got worse and finally could no longer be taken out and had to remain lying in his snowhouse which he shared with his son-in-law and his married sister. Many times during the winter, they said, he asked for his rifle so that he could shoot himself, but all Eskimos now had heard about the police and knew that some people who had committed murder for other reasons had been taken away. They were scared that they would be blamed and would not help him as they used to do when men were too sick to help themselves to die. However, after many arguments from the old man, all the men left camp for the seal hunt, as it is not customary that they be present when someone kills himself. The old man now had only the women to deal with and they were used to obeying the head of the house. He asked his wife to fasten the line of his seal spear through the roof of the snowhouse so that he could strangle himself. This she refused to do and he got so angry, she said, that she cried and finally ran outside. They could still hear her husband calling. They finally went in again and her husband kept pleading with them. His daughter, a girl fifteen or sixteen years old, then went out and fastened the line but did not return. The old man made a loop, then got on his knees and called for his womenfolk to come. As his daughter had not returned he told his wife to get her, and when they had come and stood around him he put his head in the loop, looked at them all, leaned forward and died at once. After a while they cut him down, wrapped him in the skin he had been lying on and dragged him outside. When the men came home that evening they pulled the body to a little rocky island and left it there, as no Eskimo likes to lie on the ice when he is dead. Then the whole group had to move camp perhaps 10 miles or so. I went to the little island to look at the dead man so as to confirm their story that he had died from strangulation, although I believed them. Just before my return a strong snowstorm blew up, lasting for several days. No one could go out hunting and they had to sit in their snow-houses, cold and miserable. On my return to camp a few days later, they said the storm must have been sent by the dead man because I had disturbed him.

The return, 1944

While at Halifax during the winter 1943–44 we again received instructions to navigate the North West Passage. This time we were to use the Lancaster Sound route. We left Halifax Harbour on July 22 and after three days for

repairs at Sydney, N.S., we headed northward on July 26. We called at Curling Cove, Newfoundland, to fill our oil-tanks, as this was the last place on our route where oil could be obtained. On July 29 we passed through the Strait of Belle Isle. From there onwards there were many icebergs and we were greatly hampered by fog along the Labrador coast. No observation could be obtained but on August 2 we got a glimpse of Cape Chidley. Shortly afterwards we obtained a radio bearing from Resolution Island. The weather continued thick and foggy and drift ice appeared. As we could not afford to lose any more time we decided to pass by the call at Frobisher Bay and continue northward. By August 4 we had worked up to Leopold Island, the north side of Cumberland Sound. As we approached Cape Walsingham the ice became heavier and we could make no progress. I therefore proceeded across to the Greenland coast which we sighted on August 6. On this side of Davis Strait there was fine clear weather and open water except for giant icebergs. Off the Great Halibut Bank conditions looked good to westward, so we crossed to Baffin Island and picked up the land around the Clyde River. Again fog and floe ice slowed us considerably. It was August 12 before we finally anchored in front of our Pond Inlet detachment. Had our instructions not included this call, we would have continued northward along the Greenland coast until a little past Lancaster Sound before cutting across, and thus saved much time from working ice. During the early part of summer there is much less ice on the west Greenland coast than the east Baffin Island coast. Our time was spent in unloading supplies and taking on equipment previously cached for the *St. Roch*.

We pulled away from Pond Inlet on August 17. Proceeding up Navy Board Inlet, we made a short stop at Low Point to pick up some articles belonging to the Eskimo family whom we had taken on board at Pond Inlet. While crossing Lancaster Sound, we ran into a strong south-easterly gale with snow and sleet. Due to the absence of floe ice, a nasty choppy sea came up. We found shelter in the lee of a huge, flat-topped iceberg near Cape Warrender and cruised back and forth for six hours while the whole vessel became covered with a sheet of ice from the spray and sleet. Our poor dogs on top of the deck-load suffered most from the freezing spray until finally we bundled them all into a little cargo scow which we covered with pieces of canvas. When the gale abated we proceeded to Dundas Harbour, North Devon Island, and anchored there until August 19.

There was still a fresh south-east wind with sleet and no visibility as we moved out, so we skirted the high cliff-like shore. At noon we came abreast of a large inlet which first appeared as a small opening in the cliffs. We entered and proceeded up the inlet until we found anchorage close to shore in a little cove with a depth of 18 fathoms of water. Here we went ashore and built a cairn, in which we placed a brass cylinder containing a record of our visit. We saw numerous bear tracks but none other. On the bank of a stream running down from the hills into the cover we discovered the ruins of three ancient dwellings made of stones and bones. Poor weather prevented me from determining our exact position but I judged it to be either Stratton Creek or Burnett Creek. Heavy snow fell during the night but we could not afford to linger and so proceeded westward along the coast. The falling snow at times

Eskimo from Perry River who pointed out where Franklin's ship sank near Sherman Inlet

Eskimo woman who knew Amundsen, with her grandchild from Gjöa Haven

Young Eskimo mother and child from Thom Bay region

Eskimo women from Cambridge Bay

The writer with Eskimo woman from King William Island who knew many stories about Franklin's party

Eskimos from King William Island

shut out all visibility. The weather cleared after we crossed Maxwell Bay, Devon Island, which seemed suitable for shipping, and before us lay a remarkable stretch of high, flat-topped table-land. The steep walls rose directly from the water's edge leaving no beach. To the southward we could see Prince Leopold Island and some icebergs. We neared Cape Hurd at noon on August 20.

Late that afternoon at Beechey Island we anchored in 6 fathoms of water in Erebus Bay, named after one of Sir John Franklin's ships which spent their first winter here in 1845–46. On landing we went immediately to the cenotaph erected in memory of those who died on the British naval expedition of 1852 under Sir Edward Belcher, while in search of the Franklin Party. On the beach we examined the remains of a cache known as Northumberland House, established by Commander W. S. Pullen of H.M.S. *North Star* who wintered here in 1852–54. All that was left was thousands of oak barrel staves and pieces of coal. Nearby we found pieces of the keel, stem, and planking of the yacht *Mary*, a small vessel of 12 tons left at Cape Spencer, Devon Island, in 1850 by Sir John Ross, who hoped it would save chance survivors of the Franklin Expedition. It was removed a few years later to Beechey Island where it has since remained. Captain Bernier visited this place in 1906; we found his record in a cairn on an elevated plateau and replaced it with an account of our own visit. Our brief tour revealed nothing more of historic interest. The island is desolate and barren and without fresh water. We did not venture far inland because snow fell continuously during our stay and the island was buried under a deep mantle.

We left Beechey Island on August 22, passed Cape Hotham, Cornwallis Island, and Wellington Channel which was clear of ice to the northward, but soon the weather changed and ice appeared drifting eastward. Our course took us north of Griffith, Somerville, and Brown Islands through floes which, though of only one year's formation, were getting heavier and more tightly packed. Here we bagged four walrus which provided a welcome change of food for us, and especially for the Eskimos and our dogs. Because of heavy packed ice along the Cornwallis Island shore we were unable to land. During the morning of August 23 we reached a point about 8 miles east of Cape Cockburn on Bathurst Island but were unable to penetrate farther as the thickly packed ice moved eastward at great speed, carrying us along with it for about 20 miles until abeam of Ackland Bay where we managed to get free. We then worked our way inshore and anchored behind some shoals on which heavy ice was grounded, breaking the flow of drifting ice. It sheltered us until the morning of the 24th when the wind changed and cleared the ice from the shores. We followed up the lead and anchored off Cape Cockburn. Here we immediately went ashore to look for the cairn built by Captain Bernier but failed to locate it. Perhaps it had been destroyed by bears, for we saw many bear tracks in the snow.

We built a cairn for our records in a conspicuous place, close to a jutting rock about 300 feet high. From this vantage point we saw that the ice in Melville Sound was tightly packed to the west and south. The whole country was padded in deep new-fallen snow. Ice pressure from Austin Channel made it imperative that we move without delay, so we at once started working

northward. Though the ice was not heavy and the surface broken, the constant westerly winds and the heavy snowfall held it together. We alternately steamed and drifted until late in the evening, when we had reached Schomberg Point.

Here we found a good lead westward to the north end of Byam Martin Island where we anchored and went ashore to build a cairn and deposit a cylinder with a record. Only a small cairn could be built because of the snow cover and it was hard to find stones and rocks. We saw several caribou tracks in the new snow.

In the early morning of August 26 we were under way again and heading westward for Melville Island. We enjoyed the first clear weather for days and saw very little ice. As we approached the beach of Consett Head, we sighted a dozen musk-oxen grazing on the grassy lowland close to the beach, and we saw several small herds as we proceeded southward. At 1.30 p.m., perceiving in the distance what appeared to be a large cairn, we anchored in a shallow bay north of Griffith Point. A party set out to investigate but the object of our attention proved to be a lone bull musk-ox standing motionless. A mile and a half inland a small cairn was built and a record placed in it. We reached Palmer Point at midnight and anchored close to shore in 25 fathoms of water. For a few days navigation had been difficult because of constant snowfall and thick weather which obscured the sun and the land most of the time. The ship's compasses had been bafflingly unresponsive for several days, often with their north points fixed on the ship's head irrespective of our course. During the night and forenoon of August 27 we again had heavy snowfall and no visibility. We ventured ashore however and deposited a record on a pyramid-shaped rock. Rock-piles of this kind made by Eskimo hunters signified that in the remote past this land had been inhabited. Green vegetation could be seen protruding through the snow which discouraged us from going very far inland. During the afternoon of August 27 the weather cleared and we pulled out for Dealy Island. The cairn on top of the island, consisting of a huge pile of stones on which was a large spar surmounted by three barrels, could be seen from a long way off. We anchored close inshore, and at once set out to examine the massive cache which, like the cairn above, had been built in the spring of 1853 by Captain Henry Kellett who had spent the winter here in H.M.S. *Resolute*. The cache, partially destroyed and its contents scattered everywhere by marauding bears, had been erected in the shape of a house. Although most of the sturdy stone walls still stood, the roof had long since fallen in. At one end were iron tanks of hard-tack; the tanks were rusted through and the hard-tack was wet and sodden. Canned meats and vegetables stacked up and covered with sods formed part of one wall. The centre of the building was a conglomeration of broken barrels of flour, clothing, coal, rope, and broken hardwood pulleys for ships' blocks. Everything was still frozen and ice covered the interior of the cache. Outside were scattered leather seaboots, broken barrels of chocolates, peas and beans, all wet and sodden. On the beach were two broken Ross rifles and boxes of ammunition nearly buried in the sand. The rifles had been left in 1909 by Captain Bernier, whose records we found in the cairn. We picked out a few good tins, some of which contained ox-cheek soup, apparently made in 1850 in a factory opposite East India House, London.

As the season was getting on, we could not afford to remain long and on the morning of August 28 we pulled out for Winter Harbour about 30 miles to the westward. The weather was very thick when we arrived and we had to anchor outside for a few hours, waiting for the weather to clear. Finally we entered and anchored in about 5 fathoms of water. In the harbour itself there were many large pieces of heavy ice aground. We immediately went ashore to visit Parry Rock which could be clearly seen. On the rock were carved the names of H.M. Ships *Hecla* and *Griper* as well as the names of several seamen from these ships. These two vessels were the first to reach and winter here in 1819–20 and were under the command of William Edward Parry, R.N., who was, I think, the most outstanding arctic explorer of his day. On the rock was also a large copper plate, inscribed with the Union Jack and the Canadian Coat of Arms and the following inscription:

> This Memorial Is Erected Today To Commemorate The Taking Possession For the Dominion Of Canada, Of The Whole Arctic Archipelago, Laying To The North Of America. From Long. 60 W to 141 W, Up to Lat. 90 North, Winter Hrb, Melville Island, C.G.S. Arctic. July 1st, 1909, J. E. Bernier, Commander, J. V. Koenig, Sculptor.

Whilst in Winter Harbour we also found a bottle containing a notice deposited in 1929 by the late Inspector Joy, R.C.M.P., who had visited this spot while making perhaps the longest and most famous patrol in arctic history. Again heavy snowfall prevented us from venturing very far inland.

After placing a record of our visit at Parry Rock, we left Winter Harbour at 1.20 p.m. on August 30 and enjoyed a clear run south-westward for 30 miles although the heavy pack could be seen to the south of us. We were now at the eastern entrance to McClure Strait, in waters never before traversed by any vessel. Here we encountered the heaviest ice of the voyage in large unbroken floes. We were soon forced to moor to the ice and took the opportunity to fill our fresh-water tanks from the fresh-water pools on the ice. We were greatly hampered by thick fog and sleet, but by taking every opportunity we gradually worked southward, alternately tying up to the ice and drifting. Fortunately the weather now was almost calm with only a slight draught of wind from the north. The floes appeared to revolve clockwise for we always found ourselves on the north side of a floe after being tied to it for a few hours. Late in the evening of September 2, land suddenly loomed ahead through the fog and we were again forced to moor to a grounded floe close to shore and await better weather for, because of our merry-go-round drift, I could not decide whether we were near Russell Point on Banks Island or Peel Point on Victoria Island. At daylight, September 3, we continued up what proved to be Richard Collinson Inlet. We soon found our mistake and, turning, followed the coast back and entered Prince of Wales Strait. There were only a few small pieces of ice, and wonderful clear weather and sunshine greeted us. It was the only really fine day we had during the entire passage. That night we were off the southern end of the strait and, shutting down our engine, drifted until daylight when we were close to Ramsay Island. Shortly afterwards we passed the entrance to Walker Bay, our winter quarters of 1940–41, and about noon

September 4 we anchored at Holman Island. I thought it strange that no one came to meet us, as there are a Roman Catholic mission, a Hudson's Bay post, and several houses there. A blast from our whistle brought no sign of life. When we went ashore we learned that the people had been up all night unloading supplies from the H.B.C. vessel *Fort Ross*, which had left only a few hours before our arrival and, tired out, they had gone to bed. When awakened by our whistle, they thought the *Fort Ross* had returned. This made history, for two Canadian vessels had between them completely circumnavigated the North American Continent; the *Fort Ross* had left Halifax three months before us and had sailed through the Panama Canal, up the west coast to Vancouver, where she had loaded for the Western Arctic.

On September 5, we left the island and before midnight were in a field of heavy ice 20 miles north of the mainland off Keats Point. Next day, buffeted by strong winds, we crawled through tightly packed ice along the shore to Cape Parry, then cut across Franklin Bay and followed the shoreline to Cape Bathurst. We were now in what we might call home waters, but they did not give us a very warm welcome for we ran into a blinding snowstorm. All that day and the next we bucked the heavy ice which gradually forced us closer to shore, and late at night on September 7 we had to tie up to grounded ice near Toker Point.

Next morning we were able to make very little progress, for fog had settled down and joined with the ice as though deliberately to impede us. At noon however it lifted and visibility improved sufficiently for us to see that the way to the west was completely closed. As fresh north winds were driving more ice upon us, I decided to bear toward Tuktoyaktuk. The shallow water and the strong current from the Mackenzie River kept a large stretch of open water there. When we reached the harbour's mouth at 6 p.m. the entrance markers were indistinguishable in the darkness and we grounded on the mud flat. Fortunately we had very little headway on, so were able to back off again. We anchored in 3 fathoms of water, although we knew a gale was on its way. Daylight, September 9, brought the gale and pouring rain. Before we got under way, the entrance markers had blown down. The entrance is tricky, but all we could do was to attempt to enter. Soon the water was thick with churned-up mud; the vessel rolled so violently that one of our dories fell from the davits right on to the boat deck. By a miracle the swell lifted us over the shallows. Once inside we dropped both anchors and let out all our cable. The gale reached hurricane force and the water rose 10 feet, flooding the Hudson's Bay Company buildings, washing away goods and equipment, and drowning several native-owned dogs. Small islands of peat embedding willows and cranberry bushes drifted by. It was the worst storm that had ever struck the settlement and the *St. Roch* rode it out, though we entered the harbour only just in time to save ourselves and the ship from certain destruction.

By the evening of September 10 we managed to get ashore. The sandspit was completely changed. Huge chunks of soil had been torn from the banks of the island, revealing old blue ice. Mackenzie Bay was turned into a solid mass of packed ice. Though the gale had subsided, unfavourable weather continued for several days, with alternate snow squalls and pouring rain, and

when a cruising 'plane from Aklavik reported that unbroken ice lay between Pullen and Herschel Islands it looked as though we were fated to winter at Tuktoyaktuk. So we set our nets and began storing up dog-feed. On September 17, as fresh winds blew from the east, the weather improved and we decided to attempt the crossing at least to Herschel. The storm had made the entrance of the harbour shallower still, and we again grounded for a few minutes. We passed Pullen Island that night and had exceedingly fine weather of which we took advantage, steaming in leads which appeared as if just made for us. At dawn very heavy ice slowed us down, but there was a single lead towards Herschel Island. Some floes were at least 10 miles long. One we steamed past had seven bears on it, but there was no time for killing. As we drew near Herschel, fog again settled down, but finally we entered the harbour and immediately moored to the beach where we unloaded some fuel drums, gasolene, and kerosene. The bay was choked with heavy old ice gone aground and the island was under snow. That night the gale blew so severely that it confined us to the ship all the following day, but fortunately the great slabs of grounded ice acted as a natural breakwater.

Next morning the outlook brightened. It seemed possible that we might get through and not have to winter. We immediately set to work, unloaded 11 tons of coal and some of our excess stores, and installed our Eskimo family in one of the empty houses. Fortunately we were able to hitch up our dogs and drive the sledge right along the shipside. We had been in radio communication with Point Barrow and had been told that the ice pack was solid to the shore and that the season was the worst in years. The harbour at Herschel was freezing over fast, but a slight draught of easterly wind was now felt. We at once ceased unloading and prepared to leave, and were under way by 2.30 p.m., September 21. We made good time to Barter Island. From there we were forced to hug the shoreline and next afternoon steamed past Flaxman Island. Then, still hugging the shore, we groped our way through thick fog off the north coast. We could not see the sun and were entirely dependent on our hand lead line. We moved slowly, taking frequent soundings. Suddenly, at 1.45 a.m. September 24, the leadsman shouted, "We've lost the bottom," and I knew then that we had passed the point. Shortly afterwards we saw the welcome lights of the settlement at Cape Smyth, but we could not stop, for the ice was setting in on the shore again very rapidly, it was pitch dark, and we were still bucking ice. About noon that day we reached the settlement of Wainwright and were clear.

On September 27 we passed through Bering Strait, and that evening anchored under the steep rocky shore of King Island. There is a village there, built almost like a bird's nest on the sloping south side of the island. We had our Blue Ensign flying and I thought it strange that we saw no sign of life. We signalled but no one appeared. We then thought of hoisting the stars and stripes. At once the village came to life, natives appeared from the cliffs, kayaks took to the water, and soon we had a dozen or more men aboard, eager to trade ivory carvings. We asked why they had not come out before, and they said they were scared of our Blue Ensign, thinking we might be an enemy, but when they saw the Stars and Stripes as well they knew we must be friends and were eager to trade with us.

We made good time down the Bering Sea and arrived within sight of Akutan Island on October 1. Early that morning our old enemies—fog and dirty weather—returned, but we finally entered Akutan Harbour and after proper identifications had been made to the United States naval officers we were permitted to moor alongside the fuelling wharf. Commander Lee and his staff came aboard and greeted us heartily. We remained in this friendly haven until October 4, when we proceeded to sea for the home run. After an uneventful passage across the Pacific, the *St. Roch* entered the inside passage and anchored for the night in Shushartie Bay on October 12.

At 6 p.m. October 16, we moored alongside the wharf at Vancouver. Our North West Passage was over. In eighty-six days we had travelled 7295 miles. During that time we had only steamed 1031 hours and 34 minutes.

This account of our latest and most successful voyage would not be complete if I did not pay tribute to all members of my crew. Tribute is due also to those early explorers whose sacrifices and exploits blazed most of our trail, whose successes and failures became lessons from which we learned much. When I reached the places which had known such men as Sir Edward Parry, Sir John Franklin, Sir John Ross, Captain Henry Kellett, Captain Francis L. McClintock, Captain Richard Collinson, Captain Robert McClure, and many others, I felt that I was on hallowed ground. I pictured them and their crews wintering in isolation and discomfort in crowded ships, optimistically waiting for spring and better ice conditions. Some of them perished, all risked death, to carry the proud flag of Britain into new territory.

But the Arctic Seas will always be what they are. Some ships will find the passage of them easy, others difficult, and some will meet disaster. But one thing is certain; modern ships will have the advantage in power and strength, and if held up will merely have to wait until a little later in the season. To future arctic vessels, the young ice which forms even in open calm water and which stopped us many times will present no obstacle. They will plough right through it. The main thing is to watch the ice movements and be in the right spot at the right time. For the ice waits for no one.

TRAVELS IN JAPANESE-OCCUPIED MALAYA

F. SPENCER CHAPMAN

Evening Meeting of the Society, 16 December 1946

IN AUGUST 1941 I found myself posted to Singapore as second in command, and later in command, of a small school of guerilla warfare. After specializing in the fieldcraft and equipment side of commando work, I reached Malaya after a year in Australia, where I had been sent with Mike Calvert—later one of Wingate's column commanders—to start commandos in that country and in New Zealand.

One of the primary objects of the military department to which I was attached was to organize left-behind parties (I prefer the name stay-behind parties: it sounds less abandoned) of Europeans and Asiatics in various parts of the Far East which we thought might be overrun by the Japanese. Unfortunately this belief did not seem to be shared by those in command and, as far as Malaya was concerned, we were not allowed to make preparations of any sort until December 8, on which night, it will be remembered, Singapore was bombed by the Japanese. Only then were we allowed to carry on with the plan which had been put up to Malayan Command some months previously; and we were allowed to start training the young Chinese Communists at Singapore. Having handed over the school to another, I went up to the advance headquarters of the 3rd Indian Corps at Kuala Lumpur primarily to organize raiding parties behind the Japanese lines which were by then—December 20—already a third of the way down Perak (map following p. 144).

The first thing to be done was to have a look at the enemy—for already rumour had it that the Jap was something phenomenal as a jungle fighter. Accordingly with two companions I crossed the Perak river at Parit and spent four days behind the lines watching the Jap cycle-troops and staff cars pouring along the roads towards the river. This reconnaissance more than ever convinced me of the vulnerability of the advancing Japanese forces to guerilla attacks, and I put up a last-minute plan for a few small British stay-behind parties to enter the jungle at once as far forward as they could get. It was too late now to organize mixed parties—as originally planned—officered by planters and tin-miners from the Volunteers who knew the languages and customs of the country and manned by Malays, Chinese, and Indians; but I knew that a considerable number of Chinese Communists who had been trained at our school at Singapore were being put into the jungle and well supplied with arms and demolitions as a nucleus for resistance groups, and I hoped that we might get in touch with them if the peninsula was overrun for any length of time. (In those days no one ever spoke of the possibility of Singapore itself falling.)

The plan was that a number of small self-contained parties should be installed across the line Kuala Kubu–Kuala Lipis, a distance of only fifty miles

as the hornbill flies, but a belt in which all the land routes down the peninsula are constricted: the main west coast road and railway (farther west the swamps of the Bernam river prevent all land movement); the east coast railway which comes down from Siam and Kota Bahru to join the other line at Gemas, and the east coast road from Kuantan which picks up the Kuala Lipis road at Benta and crosses the Main Range by the Gap or the Ginting Sempah or continues down the east side of the mountains to Karak (where it picks up the Temerloh road) and Kuala Pilah.

The Japs were already approaching Slim River when, in the first few days of 1942, I rushed round Kuala Lumpur trying to collect suitable personnel and choosing and packing up stores which were already being packed up for evacuation. In all about fifty British officers comprised the stay-behind parties under my command, but of these only a handful were under my control owing to difficulties of communication. Indeed, so short were we of equipment that we had only one transmission set—at my headquarters—and the only way I could have communicated with the other parties was by sending a signal to Singapore whence it would be transmitted as an after-news announcement for them to pick up on their ordinary receiving sets.

There were three parties more or less under my control: my headquarters a few miles north of Tanjong Malim, consisting of four planter-Volunteers, a Sapper officer, a Chinese wireless operator, and myself; a party of five officers —mostly tin-miners—and a Malay at Kampong Dong on the Raub–Benta road, and a party of five officers at Sungei Gow between Bentong and Karak. Each party was supplied with several lorry-loads of provisions, ammunition, and demolition stores, and there was an extra supply-dump near Tras which was more or less equidistant from the three camps and which was to serve as a rendezvous in case any of the parties were in trouble.

Four of my own party—Vanrenan, Hembry, Graham, and Ah Lam—took the stores up to the jungle edge at Tanjong Malim on 5 January 1942, while I remained at Kuala Lumpur to get the other hideouts provisioned, intending to join them at Tanjong Malim on January 7 with Harvey and Sartin, the other two members of my party, who were still hiding the reserve dump in the jungle at Sungei Sempam near Tras. On January 6 I went down with my first attack of fever. Next day I sent a despatch rider up to Vanrenan at Tanjong Malim to say that I might be a day late—for I had persuaded an M.O. to let me carry out my plan on condition that I lay up in the jungle until my temperature, which was then 103 degrees, had returned to normal. But the messenger returned to say that the Japs had broken through at Slim River and our forces had already withdrawn from Tanjong Malim, blowing the bridge behind them, so that he could not deliver my message.

On January 8, having persuaded the Sappers not to blow the bridges until the car that took me in had returned, I joined Harvey and Sartin at Sungei Sempam. My plan was that as soon as I was fit enough to travel we should cross the Main Range and join Vanrenan's party at Tanjong Malim.

It was another ten days before I was fit enough to travel. The distance from camp to camp was only 16 miles, though we had to climb to 5000 feet to cross the Main Range; and footpaths running in from each side—according to the map—reduced this distance to ten. Surely, I thought, even if we have

to cut every step of the way with our jungle knives, we can at least cover 2 miles per day. Accordingly, carrying a week's food to be on the safe side, we left our camp near Sungei Sempan on January 18 and set off for Tanjong Malim.

But we had reckoned without the Malayan jungle and it was to be twelve days before we reached our destination. In the first place the map, though excellent, was fifteen years out of date and the footpaths no longer existed. The going was worse than I had believed possible. We were continually climbing mountain-sides so steep that we had to haul ourselves up by roots and saplings and lower ourselves down the other side with rattan lines, and the only "level" places were valleys full of enormous boulders covered with a treacherous layer of creepers and moss. Direction finding in the jungle is surely more difficult than anywhere else in the world. I had carefully worked out a route on the 1-inch map, but as soon as we attempted to walk on a certain bearing we would inevitably be driven off our course by a mountain torrent which we could not cross until we had found a tree-fall bridge, by impenetrable bamboo or thorn thickets, by steep rocky outcrops, swamps, and fallen trees. Moreover, in the dense jungle which limited visibility to about 50 yards there was no object on which to march, so that we had to watch the compass continually; and even if a landslide or fallen tree provided a loophole through which we could obtain a view, we merely saw one blue tree-covered hill behind another fading into the distance, and there was no way of identifying any one of these monotonous features with the myriad mountains shown on the map.

Although we had cut our loads down to a minimum, concentrated rations had not been available in Malaya and we had had to take tinned food and an emergency ration of sugar, oatmeal, and biscuit. We carried no tent or blankets or even sweaters; but on the other hand, as we might need them on the other side, we had to take Tommy-guns, grenades, and pistols. Our loads were thus about 25 lb. each and Tommy-guns, though excellent for gangsters to use from high-powered cars in the streets of Chicago, are certainly the most awkward things in the world to carry in thick jungle.

It rained—if one can use so mild a word—almost continuously and one of the worst results of this was that our matches, in spite of elaborate precautions, soon disintegrated so that we could no longer cook our meals, dry our clothes, keep ourselves warm at night, or, worst of all, keep at bay the voracious insects of the jungle. I had always imagined it was warm in the tropical jungle, but at night, though we made leaf shelters and wore all our clothes, we shook with cold beneath our sodden groundsheets, and in the mornings our faces would be so swollen with the bites of mosquitoes and sand-flies that we had to bathe them in cold water before we could even open our eyes. Worst of all were the leeches; every night we had to remove some dozens of these revolting bloated creatures from the most tender parts of our bodies, and apart from the irritation of the bites, the loss of blood was considerable.

We had eaten up the heavy tinned food in the first few days and now we found that the rain had melted most of the sugar and reduced the biscuit to sodden pulp. For the last week of the journey our daily ration was two spoonfuls of raw oatmeal each. Our hands and faces were a network of cuts and

scratches and our bodies covered with sores from leech bites or the abrasion of sodden clothes which were by now in rags. I had not the faintest idea where we were and even began to doubt the compass—always the last resort of incompetent travellers—and to fear that we were really moving north or south along the axis of the Main Range. For this reason, if for no other, there seemed little point in turning back and anyway we hoped against hope that our friends were still waiting for us on the other side.

On the eleventh day, on the summit of a high ridge, we found traces of a small path running westward and next day it led us down to the head of the pipe-line on the Bernam river—miraculously the very spot for which we had been making—and we soon fell in with some friendly Malays who took us down to their *kampong* and gave us a wonderful meal of rice and curry. That night we reached the jungle hideout where we hoped that Vanrenan's party would still be living; but, alas, we were disappointed and our miserable journey had been in vain.

By questioning the Chinese, we were gradually able to piece together what had happened. After I had left the others they had started, with the help of some Chinese coolies, to carry the stores back into the jungle. Suddenly one evening, a man came running up the side road to say that the Japs were just coming, and both Chinese and white men took refuge in the jungle. Next morning when Vanrena returned, he found that every single case had been looted by the coolies—his weapons, demolitions, food, even the wireless. There he was, apparently deserted by his leader—for I had failed to keep the rendezvous—without stores and equipment, and with the Japs already pouring down the main road through Tanjong Malim. His only course was to take to the jungle and try to catch up with the retreating British forces.[1]

At first it looked as if we had no other course but to follow their example, but that night—it was now January 30—we made a surprise raid on the coolie lines and managed to recover most of the military stores though the food had already been devoured. We then had to persuade the leader of the Chinese to maintain us in our jungle hideout in order that we could operate against the Japanese.

For the next fortnight, until February 14, we operated almost every night against the Japanese who were rushing men and equipment, by night and day, down the road and railway towards Singapore. In that time the three of us managed to wreck seven trains, to cut the railway in about sixty places including demolishing fifteen bridges, and to damage or destroy some forty motor vehicles; we also killed or wounded between five and fifteen hundred Japs. One of our chief troubles was that we never had time to stop and count, but had to rely on Chinese reports to assess results; but after the surrender, when I returned to Malaya as a Civil Affairs officer, I was able to substantiate these figures by questioning Malays and Chinese who had been forced to work for the Japanese, and I also discovered—and this was perhaps our most valuable achievement—that the Japs, being under the impression that there were two

[1] The Chinese wireless operator went his own way and the three planters got out by boat to Sumatra and thence to Singapore. Hembry was ill but the other two, hearing that I had still intended to reach Tanjong Malim, returned just before the fall of Singapore to look for me. Unfortunately they were caught by the Japanese. A year later they managed to escape, but on being recaptured were beheaded.

Phot. supplied by Paul Popper

Malayan jungle

Phot. N. Kitching

Malay kampong

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A "drop" with signal fires, letter J (at right) for recognition, and collapsed parachutes

Phot. Crown Copyright Reserved

Liberator over Malayan paddy fields

hundred Australians operating in the jungle, had stopped two thousand front-line troops at Tanjong Malim especially to hunt us down.

Before we started operations I made a map enlargement of the area and we soon got to know every footpath and short cut within our target area; but we made a point of never operating within five miles of our valley, so as to protect the Chinese on whom we depended. This made great demands upon us, especially as our limiting factor was the amount of explosive the three of us could carry. As we dared not leave our hideout until dusk and it took all the hours of darkness to lay the charges, we soon found ourselves returning from operations in daylight and so had to disguise ourselves as Indians, using a potent mixture of potassium permanganate, iodine, coffee, and lampblack, and wearing a head-cloth, shirt, and *dhoti* like a Tamil rubber tapper. Harvey, fortunately, could speak Tamil—indeed he smelt like one too, for the dogs which barked furiously at Sartin and myself took no notice at all of him. Sometimes we would meet Japanese cycle patrols searching for us, but luckily the Japs, in spite of all their talk about equality, insisted that all other races must cover their faces and bow low on meeting a Japanese, and this we found a most convenient dispensation.

On the railway we usually used pressure switches which were set off by the weight of the engine so that it would thus blow itself up while we were safely on our way home or indeed already asleep on the following day, for after a time the Japanese ceased to use the railway at night—presumably for fear of the two hundred Australians. We also placed several small charges on either side of the main demolition to be fired by delayed-action time-pencils so that breakdown gangs would be discouraged from working with too much zeal.

Things did not always work quite so simply as this. One night we were just setting a charge beneath the line when Sartin packed the pressure-switch too hard against the lower surface of the rail and set it off. Only a dud cap saved us from going up with the 10 lb. of gun-cotton. Just before dawn we were laying our last charge, consisting of the rest of our explosive, on a small girder bridge. Suddenly we heard a train approaching from the north and realized we should at last be able to see the results of one of our demolitions. But by the time we had found the pliers and the box of detonators and packed up all our gear, the train was already bearing down upon us and as we had no desire to be run over as well as blown up we started racing down the small track beside the line. As the train—not unnaturally—seemed to be gaining on us, we dashed into the jungle, only to be immersed up to our elbows in a foul swamp where we stood immobilized, holding our Tommy-guns above the water. Suddenly there was a blinding flash followed by a shattering explosion, and bits of train and rail and—we hoped—Jap flew through the air and landed all round us. But something had gone wrong (we afterwards discovered that the approaching train had displaced one of the charges) and the train came on, clanking and hissing with escaping steam and lighting us up as it passed. It groaned to a standstill a few yards beyond us and some Japs, bristling with Tommy-guns and flashing torches in every direction, walked past in front of us to examine the wrecked bridge and to collect their companions who had been riding in the brake-van. Then the whole party and the terrified Tamil drivers abandoned the train and set off down the line while we extricated

ourselves from the swamp, regretting that we had no explosive left to finish the job. As dawn was at hand we waded some distance up a stream—for the Japs were using Alsatian police-dogs to track us down—and lay up in the jungle until we thought it safe to return through the rubber estates to our camp.

As the Japs were now picketing the railway line we turned our attention to the main road, though three was not nearly a large enough force to carry out a successful ambush against M.T. However, we soon developed a technique which was fairly effective. We would choose a site where the road ran through a small cutting and stop the leading vehicle of the convoy with a home-made bomb consisting of 5 lb. of gelignite inside a bamboo. This was left in the middle of the road and set off by a pull-switch. As soon as the second and with luck the third lorry had crashed into the wreckage of the first, we would open up with our Tommy-guns, then throw a number of home-made bombs into the medley. These consisted of a stick of gelignite inside a large section of bamboo filled with rubble off the road or railway—which meant that we did not have to carry grenades all the way from our camp. As we lay flat while the bombs exploded, we changed the magazines of our Tommy-guns, then fired another volley and raced away into the jungle or rubber along tracks we had previously reconnoitred. The whole operation only took about twenty seconds, and the Japs who, judging by the time they took to retaliate, kept all their weapons underneath the seat of the last lorry of the convoy, would then start to fire into the jungle though they could not possibly have seen any target. Then, presumably to keep up their courage, they would start plastering the jungle with rifle, machine-gun, and mortar fire until we were quite frightened by the noise as we made our way back to the camp.

As well as these operations on the road and railway, we climbed up to and cut a great many telephone wires and also destroyed a number of stationary vehicles by crawling up and attaching delayed-action magnetic bombs to their engines.

After a fortnight of this work we decided to return to our original camp near Tras. We were completely exhausted and were already beginning to relax those extra precautions on which the very life of a guerilla depends; and Sartin, the Regular, was finding this kind of warfare so irregular that he was having nightmares. Also we had used over 1000 lb. of explosive and had practically none left; and the Japs were harrying the neighbouring kampongs to such an extent that we felt to remain any longer was not fair to the Chinese who were so nobly helping us.

Accordingly, on February 15—the very day Singapore fell, but we did not discover it until afterwards—we set off by road over the Gap to Sungei Sempam. This involved a 60-mile walk, but nothing would have persuaded us to retrace our steps over the Main Range. As we left Tanjong Malim, we bade *adieu* to the Japs by setting a large charge of explosive on the railway line. Soon afterwards a train approached from the south and we had the great satisfaction of seeing it blow itself up. But the Japs, presumably imagining they had insufficient troops there to deal with the tough Australians, had sent to Kuala Kubu for reinforcements and these soon came roaring up the road in seven lorries. It was quite easy for us to take cover in the rubber beside the

road, but when they returned some hours later they came upon us rather suddenly and we dashed into the side only to find ourselves impaled on a barbed-wire fence surrounding a patch of seedling rubber. We kept absolutely still however, and the lorries passed without incident though we were brilliantly floodlit by their headlights. Later the same night a convoy passed as we were walking through a deep cutting and we were nearly run over as we lay motionless in the gutter.

We slept in the Rest House at the Gap—on the principle that this would be the last place the Japs would search for us—and on the third day reached our original camp at Sungei Sempam.

We now learned that Singapore had fallen, and realizing that it would be a matter of years, not months, before the Japs were expelled from Malaya, determined to get in touch with the other two parties, then cross by bicycle to the west coast and try to procure a boat in which to sail across to India or Ceylon with the north-east monsoon. After a week at the camp we were joined by Garden and Haywood, who had walked over from their camp near Karak 30 miles down the road. By this time we had procured some bicycles and I cycled down with them to their camp in order to give Chrystal, Robinson, and Quayle—the three other members of Garden's party—the option of trying to get out of the country with us or hibernating in the jungle until the British should return.

We had no misadventures on the road, though we had to cycle right through Bentong where there was a Japanese garrison. I had no difficulty in persuading Garden's party to throw in their lot with us and after securing more bicycles we returned to Sungei Sempam, thus making our numbers up to eight. We tried to contact Captain Stubbington's party up at Dong, but there was no sign of them [1] so, carrying 100 lb. of provisions for the boat journey on the back of each bicycle, we set off for the coast. As a patrol of eight cyclists is too unwieldy to be safe, four of us left on the night of March 8 and the other four were to follow two nights later. The rendezvous was to be our old camp at Tanjong Malim.

Unfortunately the machines were in shocking condition and after two of them had completely broken down, Haywood and I pushed on to obtain some spare parts, leaving Chrystal and Robinson to wait in the jungle just south of Sangka Dua. At Kuala Kubu, Haywood and I were stopped by a brilliant arc lamp fixed up above the road and shining towards us, but as no sentry was in sight and there was no other way of getting our heavily laden bicycles past, we decided to "shoot the rapids," only hoping that there was no barricade across the road in the dense shadow beyond the lamp. All went well, though a Japanese sentry jumped to his feet as we passed by and shouted "*Hudu!*"—whatever that means. There was no barricade and we sped away down the road without even being shot at.

We were a little anxious as we knew there was a Jap sentry-box a mile ahead where the Gap road meets the main west coast highway, but we had already

[1] It was only after the Japanese surrender that I learned that this party had already deserted their camp as they had been betrayed by Malays. They tried to get down the Pahang river, but on March 17 on an island near Temerloh they were surrounded by the Japanese. Stubbington, Rand, and Darby were killed in the ensuing engagement and Elkan and Pearson, who survived the war, were taken prisoner.

passed this danger spot on the way out and were not unduly frightened. Jap sentries are most remarkable: there are usually two of them and they seem to keep themselves awake by telling stories in a loud voice or doing arms drill—anyway you can hear them at about half a mile; if there is one man alone on duty, he invariably seems to be a chain smoker and you can see the glowing butt of his cigarette at several hundred yards. If they see you, they often flash a torch at you—so that they are quite blinded if they decide to use their rifles; and if they do shoot, it does not matter very much as they are phenomenally bad marksmen.

On this occasion we came upon the sentry before we expected to and our aged bicycles betrayed our presence from afar. The Jap shone a torch on to us; then, seeing we were Europeans,[1] dropped the torch and yelling at the top of his voice fired three or four times as we pedalled frantically along the road. As soon as we were round the corner, we stopped and cut the telegraph wires in case the Japs ahead of us should be given a chance to prepare a reception party, and went on our way. We reached Tanjong Malim after lying up for a day, but were very much afraid that the second party would come to grief as the road was alive with ominous night voices.

After a few days here we managed to get in touch with some Chinese Communist guerillas whose headquarters were at Ulu Slim some 20 miles north, and they sent a party of men to contact Chrystal and Robinson who, we later discovered, had been joined by Quayle whose bicycle had also broken down. These men returned with the disquieting news that three of the second party—Garden, Harvey, and Sartin—had been caught by the Japs, but as there was no definite news and this neighbourhood was most unsafe, Haywood and I went by mountainous jungle paths to join the Chinese guerillas at Slim, where Chrystal, Robinson, and Quayle joined us in early April.

By now we had missed the north-east monsoon and had to reconcile ourselves to remaining in the country for at least another year. There was still no news of the other three so, leaving Chrystal, Robinson, and Quayle to run the training establishment which we had started for the Perak guerillas, Haywood and I set off to try to contact the guerilla central headquarters which was reported to be in Selangor, hoping to pick up some news of the prisoners and even to attempt a rescue as we passed through Kuala Kubu.[2] One of the guerilla leaders who had been at our school at Singapore had come up to the Slim camp to see me in answer to a letter I had sent to their headquarters from Tanjong Malim, and he asked us to visit his camp near Batu Caves and help to train the Selangor guerillas.

The airline distance between these two camps was only 50 miles, but we must have walked five times that distance, following remote jungle paths by day, and at night coming out and walking through the rubber and along side roads. The journey took us exactly a fortnight and we often travelled for ten or twelve hours at a stretch.

[1] After the surrender we gave up disguising ourselves as natives so that, if we were caught, we could pass ourselves off as honest soldiers who had been cut off and thus might be treated as prisoners of war instead of being beheaded at once as spies.

[2] We heard no news of them until the war was over when Garden and Sartin turned up on the Siam railway. Harvey, alas, was beheaded at the same time as Vanrenan and Graham.

In the Batu Caves camp, as well as about seventy Chinese including a few girls, there were six British soldiers who were suffering from beri beri and were in a very poor way. They were, alas, all to die before the year was out, not of any specific disease but simply because they lacked the right mental attitude.

While we were in this camp it was attacked by the Japanese, but we had some warning as a Malay had been seen snooping round the camp and the whole party migrated during the night. I took the opportunity of lying up nearby and watching the Japs carry out this attack. Several hundred Japs, Malays, and Indians approached the camp at earliest dawn and plastered it with mortar and machine-gun fire; they then entered the camp and set the *atap* huts alight. We learned later that the lorries which brought the troops removed all the inhabitants of two Chinese kampongs who had helped the guerillas and, after being made to dig their own graves, the whole party—men, women, and children—were shot or bayoneted to death.

One of the great drawbacks of living in the guerilla camps was that, as we had no wireless, we heard absolutely no news of what was happening in the rest of the world. There were rumours that Burma and Sumatra had been captured, but we did not believe things could be as bad as all that; but when the Jap newspapers said that Ceylon and Australia were about to fall, we could bear it no longer and decided to cycle over the Ginting Sempah to Haywood's old camp near Karak where we had hidden a receiving set in the jungle.

Accordingly, accompanied by three Chinese, we left Batu Caves on 1 May 1942 with a 50-mile ride ahead of us. There was a brilliant moon and on the far side of the pass we could free-wheel as fast as in daylight. The fragrance of the tropical night was particularly exhilarating after the depressing jungle camps. We passed a good many Chinese cycling in the opposite direction, but the Japs had imposed a curfew and we ignored each other's presence on the road.

As we had had some trouble with the machines, our party was straggled over several miles of road—always the danger of night cycling—and I was waiting astride my machine for one of the Chinese to catch up. Suddenly three cyclists overtook me, and as one of them came alongside I saw that he was a Malay policeman and that he had a shot-gun across his handlebars. I could easily have shot him with my revolver as he attempted to seize my handlebars, but in those days I was not thinking in terms of fighting the Malays and I merely knocked his hand away, at the same time shouting to Haywood who was waiting in front. As we pedalled at full speed down the road, the Malay shot four times and his third shot burst my back tyre and injured the calf of my left leg. I managed to hold on to Haywood, and catching up the other two Chinese, we halted as soon as we came to a patch of shadow across the road and clambered a short distance up the bank to lie in wait for the Malays. They soon came round the corner and we dropped the first one with our revolvers; but he was a very brave man and before crawling off into the jungle he had another two shots at us at point-blank range. Luckily his bicycle was undamaged and taking that in place of my own we abandoned the remaining Chinese and continued our way. My leg was bleeding profusely,

but it was only a flesh wound so we put on a first field dressing, and as I could not pedal, I held on to one of the others for the rest of the journey and shortly before dawn we reached the edge of the jungle near Haywood's old camp at Sungei Gow. As soon as it was light enough the others excavated my wound—fortunately I fainted, so did not feel the pain—and extracted a half-inch nut. Apparently the Malay had made up his own cartridges!

When at last we reached the camp, I collapsed with pneumonia and malaria, and Haywood soon fell ill too. For the next two months we were just as ill as it is possible to be without actually dying. Luckily our crises occurred at different times, so we were able to nurse each other. Apparently I was a very good patient though I do not remember much about it; indeed I was unconscious for seventeen days on end. As I recovered, Haywood got worse and worse and his uncontrollable rigors would be succeeded by fits of violent delirium. Our temperatures, which would be several degrees below normal in the morning, would be as much as 10 degrees higher by nightfall. Why we did not die I do not know, but our lives were probably saved by a Chinese *towkay* from Karak who used to keep us supplied with fresh fruit and tinned milk and a certain amount of rather weak quinine water.

About the middle of July the *towkay* appeared at our camp with two other Chinese. These were the leaders of the guerilla camp near Kampong Menchis 20 miles south of us, and they suggested that we should join their camp and in return we could give them any surplus arms and explosives we had and also set up a school to train the Pahang guerillas. This seemed an excellent idea, but whereas I was already recovering my strength and putting on some of the four or five stones I had lost, Haywood was still unable to walk and looked quite ghastly with bloodless lips and hollow cheeks. But they soon agreed to carry both of us, if necessary, to the road, then to provide a car to take us down the road to Menchis. They assured us that this was absolutely safe as the Japanese had not once used this road at night since the fall of Singapore five months previously.

Next day a stretcher party arrived and Haywood was carried down to the road. I found I could easily walk at this slow speed and on the second day we reached a Chinese rubber estate just south of Karak where we found a small Morris 8 awaiting us. All our personal gear was strapped on to the carrier; Haywood and I and a Chinese squeezed into the back, three more sat in front, and two armed with Tommy-guns stood on the running-boards. Soon we were rushing along the main road in a tunnel of light which showed the tall elephant grass and behind it patches of rubber alternating with virgin jungle. This easy progress through the fragrant tropical night was particularly satisfactory after our recent vicissitudes, and we lay back against the cushions to enjoy it.

Suddenly we saw the headlights of an approaching car. This could mean only one thing. We discovered later that one of the Chinese who had visited our camp—not a guerilla—had informed the Japs at Bentong what we were up to and they, having abandoned an ambush farther down the road, were even now returning to Bentong. Had we started half an hour later, we should have missed them.

One of the Chinese shouted excitedly, "Japun! Japun!" I suppose we ought

to have stopped at once or driven off the road into the jungle and then abandoned the car, but I did not think of that till afterwards and our driver seemed mesmerized by the oncoming lights. I remembered that Haywood could hardly walk, much less run, so I told him to get out of the car the moment we stopped and lie in the ditch; I would try to create a diversion, and then he might crawl away—the sort of stupid thing one thinks of on the spur of the moment. Soon we stopped violently to avoid crashing into the lorry which had pulled across the road, and with a yell of triumph the Japs started leaping out on to the road. The Chinese burst out of the Morris and started to run into some half-cleared land on the left of the road. I got out last, clutching two grenades from which Haywood had already pulled out the pins. I then hurled the grenades into the crowded lorry and crawled beneath the Morris to take cover as they burst. (After the surrender I heard that there were forty-two Japs in the lorry, of which my grenades killed eight and wounded many more.) As the Japs were already lining the edge of the road between me and my companions, I had to make for the rubber on the right of the road and in so doing had to run across the path of the Jap headlights; thus I not only received the full attention of the Japs but was in the line of fire of the Chinese who had opened up from the clearing on the other side of the road. A bullet passed right through my forearm—luckily missing both bones—and another cut the cartilage where my left ear joins my head and grazed my cheek bone. Oddly enough I was not aware of the arm wound until some time later when I found it would not work, but thinking I had been shot right through the head and must soon lose consciousness I hastily scratched a hole in the ground and buried my diaries and intelligence summaries which I carried in the pouches of my web equipment.

By now the noise of battle was deafening and the night was lit up with bursts of flame. The Japs were firing with rifle, Tommy-gun, machine-gun, and mortars, and somebody was shouting at the top of his voice. I tried to work my way round so as to cross the road and rejoin my friends, as I was afraid that once Haywood reached the thick jungle beyond the clearing I should have the greatest difficulty in finding him again. Also I was not sure how long I myself could carry on without help. Suddenly a mortar bomb burst beside me and I was thrown violently against a tree. Once again I was surprised to find myself still alive—and apparently in one piece—and soon afterwards I ran across the road and through the clearing beyond until I saw the flash of a Tommy-gun in front of me. This turned out to be one of the Chinese, luckily the only one who could speak any English. He had had the end of one thumb shot off but was otherwise unhurt. He told me that Haywood had fallen at the very beginning of the engagement and that he had lost touch with all the others, who had probably run out of ammunition by now. As the Japs seemed to be systematically raking the ground with mortar fire, we crawled down a dry ditch and eventually met the road again some way to the south of the battle. The Japs were still firing furiously; indeed they continued to do so until we were out of hearing.

We put a first field dressing on my arm and tucked it into the braces of my webbing out of the way. My clothes were caked with blood and I was suffering from acute dysentery, but I felt that as long as we kept on the smooth

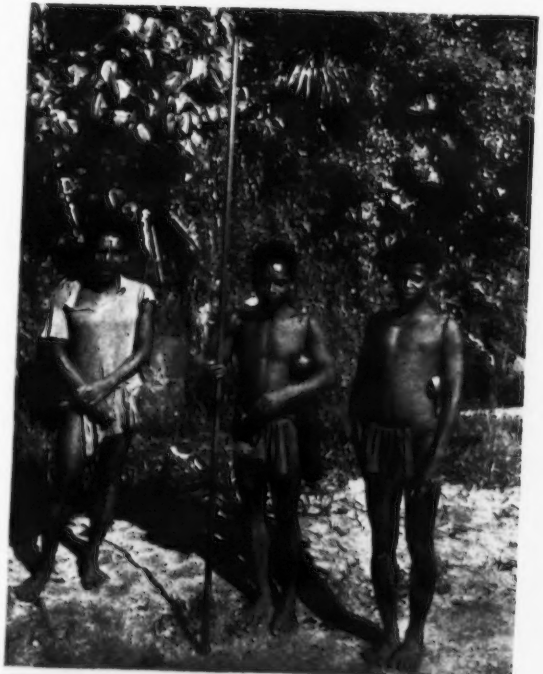
level road I could go on putting one foot in front of the other indefinitely. My companion said we still had 14 miles to go to Kampong Menchis, but once there we could probably lie up for a few days in a Chinese house at the edge of the jungle.

We had only gone a short distance when we were suddenly halted at a barricade across the road. These were Chinese police working for the Japs, but luckily the guerillas had a gentleman's agreement with them and we were not stopped, though we had to turn back and make our way round the post through a maze of vegetable gardens and paddy fields. Here we lost ourselves and were delayed about an hour so that it was already dawn as we skulked past the police station at Menchis and made our way through the rubber to a Chinese house at the edge of the jungle. Here I had a bath and was provided with a coolie's baggy trousers and jacket. After a large meal of rice with morsels of pork and salt-fish, I was given a little bed close under the *atap* roof and fell asleep hoping to stay there for some time.

After about an hour however, I was woken up to be told that the Japs were already searching the village and we must set out at once for the guerilla camp. Normally this was a three hours' walk—about three miles on the map—but in my exhausted state I found it almost impossible to keep going and as soon as we came to a hill I just had not the strength to walk up it and had to be helped along. The journey took about nine hours and I reached the camp in a state of collapse. The survivors of the motor car party straggled into the camp for the next few days, but two of the Chinese had lost their lives in the engagement and I heard quite definitely that Haywood had been shot through the chest and had died at once.

It was on 13 July 1942 that I joined the Pahang guerillas. I was to stay with them for more than a year and in that time, save for one week, I was to see no other white man. No. 6 Independent Anti-Japanese Regiment—to give the full title of the West Pahang guerillas—was one of the last to be formed, and whereas the other five groups (No. 1 in Selangor; No. 2, Negri Sembilan; No. 3, North Johore; No. 4, South Johore; No. 5, Perak) had all been built up round the nucleus of men and weapons put in by my department at Singapore, this group had grown up on its own since the fall of Singapore. Consequently they were not so well armed as the others and were singularly lacking in military knowledge. Indeed the Chinese, though incredibly brave, are surely the most unmilitary nation in the world. It was with the utmost difficulty that we could teach some of the recruits to march in step, and many of them were constitutionally incapable of closing one eye in order to sight a rifle. Nor have I ever met men with so little regard for the normal principles of safety. On the other hand, they showed remarkable fortitude in living year after year away from their families in these jungle camps, subsisting on extremely poor food, suffering from horrible jungle ulcers and fevers, and often being attacked by Japanese columns who were infinitely better armed and trained.

Although the guerillas were organized by the old Malayan Communist Party, they were by no means all Communists; indeed many of them, mostly rubber-tappers, tin-mining coolies, and vegetable gardeners, had just taken to the jungle to "have a crack" at the Jap. Thus it was that when they found themselves subjected to strict discipline and were not allowed—for security



Phot. supplied by Paul Popper

Sakai with blowpipe, quiver for poisoned arrows, and jungle knife

Phot. Dorien Leigh

In the Malayan jungle

Phot. N. Kitching

Chinese squatter growing tapioca and sugar cane

Phot. Imperial War Museum, Crown Copyright

Chinese guerillas at surrender ceremony

reasons—to return to their kampongs, many of them deserted and even turned informer. Central headquarters was a nebulous but all powerful body which I tried unsuccessfully to contact for over a year, and each group had its own headquarters which controlled the four or five patrols in its area. The Menchis patrol consisted of about a hundred men and six or seven girls, organized into a headquarters and sections of twelve men as well as runners, cooks, propaganda workers, etc. The girls were prepared to fight—like their sisters in the 8th Route Army in China—but as there were never enough weapons to go round, they spent their time nursing the sick, helping in the kitchen, or teaching Mandarin—the *lingua-franca* of the camps. An enormous amount of energy was put into political propaganda both in and outside the camps, and the greatest attraction for many of the men was that they received a free education. The discipline of the camps was magnificent—though it was that of Boy Scouts rather than soldiers—and the standards of honesty and morality were extraordinarily high.

I was an honorary member of headquarters and got on extremely well with them, especially as I resolutely refused ever to discuss politics. My job was to give military instruction and to help with the propaganda—to assure them that the British would come back sooner or later and meanwhile they must husband their resources and prepare for the time when they could actively assist the invading army. I even published a paper called *Truth: a Newssheet for all English-speaking Malayans.* This was duplicated in the camp press and distributed widely outside; but in one issue I published an article on India which smacked too much of imperialism, and that was the end of *Truth.*

The wound in my arm completely recovered after one of the girls had applied a dressing of herbs, and for a whole year I was perfectly fit and used to go out hunting daily. Indeed the amount of fresh meat that I produced—deer, pig, and above all monkey—was probably my greatest contribution to the life of the camp for we were usually very short of food. The camps were usually in the hills, three or four hours' walk—though probably only as many miles in a straight line—from the nearest Chinese kampong where rice and vegetables were grown for the guerillas, but as soon as anyone was missing from the camp or there was any trouble outside, we would have to migrate to another area and establish our food lines anew. For this reason the Menchis patrol moved five times during the year and eventually settled down in the hills near Mentakab. When things were going well we lived on rice, usually diluted with sweet-potato or tapioca, and a variety of vegetables cooked in coconut oil and salt, and an occasional meal of salt-fish, fowls, or pork; but after an attack or alarm we had to make do with tapioca and various jungle leaves. Fish were plentiful in the jungle and at certain times we used to poison them with *tuba* root or catch them by an ingenious Chinese method of damming up and draining whole sections of the river.

As long as I was well, my chief trouble was lack of reading material. I also suffered from an acute sense of frustration. In the first place, on any previous expedition I had always made collections for the British Museum or Kew; but here, as I had no previous knowledge of Malayan flora or fauna, I had no idea whether an insect or bird that I saw was one of the commonest species or new

to science. I did indeed make collections of insects and plants, and filled several notebooks with observations of the jungle birds, but somehow these always fell into the hands of the Japs. Again, although the guerilla leaders were only too glad that I should train their junior commanders, yet, being Communists, they were not at all keen to take a British officer into their confidence and as I was entirely dependent on them I was virtually their prisoner. Then the Jap, as I had proved, was a perfect target for guerillas, yet I not only had to restrain myself but had to teach the Chinese patience too. Another difficulty was the lack of information about what was happening in the rest of the world. We had no wireless sets in the camps and the Jap news, though I could discount most of it as propaganda, was unspeakably depressing. According to the English papers published by the Japs, Burma had fallen within a month (this I did not believe, though of course it was true); the Netherlands East Indies and Philippines had gone; Australia had surrendered (this I did believe, but fortunately it turned out not to be true); the Japs had taken all China; they had landed in Ceylon, and most of India had been evacuated; the Germans had broken through the Caucasus, and the British Government had been bombed out and had gone to Canada. So when it came to planning an escape from Malaya, where was there left to go to? I had amassed a vast amount of information about conditions in Malaya which I knew would be of enormous value if only I could get it to the right quarters, but with my ignorance of the customs and languages of the country—though I had learnt to speak kampong Malay—it was essential that I should get in touch with other Europeans before I could make any plans to escape.

I occasionally had letters from the three of my original party up in Perak and I heard that Pat Noone, the ethnologist, was also with them; but the Chinese said it was out of the question for me to attempt to rejoin them.

Then, when I was on a visit of instruction to the neighbouring guerilla patrol near Triang, I had a letter from two Europeans at Palong in north Johore. These men were living in a bandit camp there, and as the guerillas wished to "convert" these men—and at the same time get some of their weapons—I was allowed to go south and visit them. The normal route from Triang to Palong took three weeks and traversed the Tasek Bera, a Malay infested swamp which was quite unsafe for me. Accordingly I worked out my own route from a small-scale map which was all we had and eventually got there on New Year's Day 1943.

In the bandit camp I found Cotterill and Tyson, two old Malayan hands who had originally been left behind with a wireless set at Sungei Lembing to report on the advance of the Japanese. Unfortunately Tyson died of pneumonia while I was there, and Cotterill was not interested in my escape plans. I had hoped that from here I might be able to get in touch with some Europeans who were rumoured to be living in south Johore, but as the bandits had no communications to the south I returned to Triang and then to Mentakab.

Here I received a letter from Mr. Baker, late manager of P.C.C.L. tin-mines, who, with his sister Nona Baker, was living in the jungle near Sungei Lembing. But the messengers had taken three months over the journey and it was impossible for me to return with them.

In the middle of June 1943 I accepted an invitation to go and instruct the

guerillas in Negri Sembilan, and my secret hope was that I should be able to proceed from there to Johore. Unfortunately these guerillas, whose camps were near Titi and Pertang, had raided some of the smaller police stations and had even ambushed a force of puppet Malay and Indian troops. As a result of this the Japanese carried out a series of most determined raids against these camps which unfortunately coincided with my visit. As I approached the headquarters camp with guides, I was shot at by a jittery sentry under the impression that I was a Sikh, and in the nine days that I stayed with the Negri guerillas we were attacked seven times by the Japs, for the jungle here is too small for safety and columns of Japs with Indian and Malay troops approached from both east and west. We tried to escape southward and join the guerillas at Bahau, but finding that impossible the whole patrol eventually migrated northwards and joined up with the Pahang guerillas. While we were on the run, we had practically no food except tapioca supplied by the aborigines, and as I was again suffering from severe malaria after a year's immunity from any sort of sickness except jungle ulcers, I was only too glad when we rejoined my original friends near Menchis.

It was in early September 1943 that I was given a vague message by the leader of the Pahang guerillas saying that somebody wanted to see me in the north of Perak and that I should go up to the guerilla headquarters near the Cameron Highlands as soon as I was fit enough to travel. As there was some talk of the guerillas there having got some new kind of small Tommy-gun (obviously the Sten-gun) I guessed that at last communications had been established with India.

It took me over a month to reach Slim, as I had frequent attacks of malaria and found the greatest difficulty in climbing uphill—this was also probably due to two years of low diet—and when I got there I went down with black-water fever and was extremely ill for two months. At last, on Christmas Day 1943, when I had been in the jungle exactly two years, I reached a camp near Bidor and met two Englishmen and some Chinese who had got into Malaya by submarine from Ceylon.

These men were Davis of the Malayan Police and Broome [1] of the Malayan Civil Service, both fluent Chinese speakers. They belonged to Force 136 which had taken over the military establishment with which the three of us had been connected at Singapore. As representatives of S.E.A.C., they had been sent to try to contact any resistance groups still active in Malaya and incidentally to discover the fate of the stay-behind parties. I handed over my "command" to Davis and it was due to his and Broome's skill and energy rather than to my abortive efforts that such good relations were soon established with the Chinese guerillas, who now became known as A.J.U.F. (the Anti-Japanese Union and Forces) and later M.P.A.J.A. (the Malayan People's Anti-Japanese Army).

Davis, Broome, and I were later joined by Quayle who, it will be remembered, had stayed with the Perak guerillas. Robinson had died of fever in September 1943 and Chrystal had crossed the Main Range and was living with non-Communist guerillas near Gua Musang. Noone had also left the

[1] Later Colonel J. L. H. Davis, C.B.E., D.S.O., and Colonel R. N. Broome, M.C.

Perak camps and was reported to be living with the Sakai, the aborigines of the Malayan jungle, on whom he was an expert.

A few days after my arrival at Davis's camp near Bidor, a representative arrived from guerilla headquarters and the terms of cooperation were arranged. The guerillas were to help S.E.A.C against the Japanese until peace and order had been established, and in return British liaison officers were to train and arm them in their jungle camps. There were now three things for us to do: to establish wireless communication with our headquarters at Colombo; to bring in more men and supplies; and to arrange for one or more of our party to get out of the country by submarine and make a detailed report. And, of course, the last two of these depended on the first.

In the various submarine sorties, Davis and Broome had brought in at least four wireless sets of one sort or another and these had been hidden on the west coast near where they had landed. When they had made their way through the wide coastal plain to the mountains, the Japs were already after them and they had been unable to carry any wireless gear with them; and it was many months before the Chinese, who were singularly inefficient when it came to getting a job done, were able to bring any of this equipment up from the coast to our camp. When at last a set did arrive, it was found to be sodden with water and useless, and a second set was irreparably damaged. Then in May 1944 the Japs attacked our camp, and though there was no loss of life, all our batteries and a generator were captured. Thus, for one reason or another, it was not until 5 November 1944 that we were even able to receive the ordinary broadcasts, and it was February 1945 before we were able to generate enough power to transmit—and it still seems a minor miracle to me that after eighteen months' silence we were picked up by our headquarters in Ceylon. During this time, though we were still living with the guerillas, we were extremely short of food and all in turn suffered from jungle ulcers, dysentery, and intermittent attacks of malaria and other fevers. Worst of all was the sense of frustration in not being able to carry out our side of the bargain with the guerillas, and we were afraid that the war would be over before we could help them or strike a blow ourselves at the enemy.

In April 1944, when a succession of submarine rendezvous had failed and we were still without wireless, I determined to go in search of Noone, the ethnologist I have already mentioned, who was reported to be living with the Sakai in the north of Perak. In this area we were right in the Sakai country and they were, as always, most helpful. The Japs, with typical stupidity, had antagonized them by their barbarous and bullying methods, but the guerillas, on the other hand, had won their trust. In the days when the Japs had cut our food-lines we depended very much on the Sakai, who brought us large quantities of tapioca roots and sweet-potatoes and always had free access to the camps.

On this journey I travelled with one Chinese, and instead of following the guerilla route through the rubber and skirting the jungle edge, we went through Sakai country from Jor on the Cameron Highlands road right over the mountains to Kampong Jalong near Sungei Siput. All the way the Sakai acted as guides and we stayed in their houses at night and watched them trapping fish in the rivers and shooting squirrels and birds with their blow-

pipes and poisoned arrows. The Sakai, like most really primitive people, are delightful companions, and once again I wished I were a trained ethnologist so that my journey would be of some scientific value.

At Jalong we had to come down from the mountains in order to follow the route up the Korbu river, and here we fell in with some Chinese. These men appeared to be friendly, though they took the precaution of confiscating our weapons, but I gradually realized that we were prisoners. When I discovered that they had dealings with the Japs as well as with the Communist guerillas, I came to the conclusion that we were probably being sold to the highest bidder: they were, indeed, nothing but a gang of bandits. They agreed to let my Chinese go, so I sent him back to our camp with a letter to Davis, and at midnight on 10 May 1944 I managed to escape by doping my guards' coffee with morphia. (In those days we always carried a lethal dose in case we were captured by the Japs and knew we were going to be tortured.)

All that night I travelled barefooted so that the bandits could not track me and next day I passed Larek tin mine and crossed the watershed to the Sungei Chemor. I was trying to take a short cut to the route by which we had come and, failing that, I was searching for Sakai who could act as guides. At the end of a long day's travelling, I was wading down the Chemor river—often the easiest way of progress in thick jungle—when I saw to my delight two Sakai washing themselves in the river. As they are timid folk I waited until I was quite near, then hailed them in my best Malay. Suddenly, to my utter consternation, people appeared in every direction—and I realized I had walked right into the middle of a Japanese camp. Following their usual custom the Japs had captured some Sakai and were forcing them to reveal the whereabouts of the guerillas.

I was soon surrounded by a mob of the little yellow men—there were about a hundred Japs and twice as many Indian troops—and one of them hit me over the head with a rifle, but luckily the stock broke and it did not hurt. Then the officer in charge took me aside and started asking questions. I had a good deal to explain away and was particularly worried because in my rucksack was a diary. Luckily anything of security was written in Eskimo, but I had mentioned some Sakai by name and was most anxious not to get them into trouble. I explained that I *had* been working with the Chinese guerillas, but that when I found they were all Communists I had quarrelled with them and gone off to live with the Sakai. I told them how nice it was to be among civilized people again and that I should be only too glad to go back to Ipoh with them and tell them anything they wanted to know about the wicked Communists. I then managed to roll my diary up inside a handkerchief, transfer it under the eyes of the Japs into my pocket, and later throw it into the fire inside a faggot of bamboo with which I had lit my pipe.

That night I slept in the middle of a row of twenty Japanese beneath a canvas lean-to shelter. They made no attempt to tie my hands, but we were packed so closely that I could not turn over without touching the officers on either side of me. There was a brilliant bamboo fire a short distance away, and three sentries kept guard.

In the early hours of the morning I managed to loosen the awning behind my head. I then packed my blanket sleeping-bag with bits of equipment

belonging to my companions, pushing a spare pair of boots well into the corners to resemble my feet. At the same time I edged further and further back. When none of the guards was actually looking at me, I gave a tremendous heave at the canvas and managed to force myself out into the night.

I crashed through a bamboo thicket, raced along a fallen tree, and slithered some distance down the river. Then I stopped to listen. There was not a sound from the Japs; probably they were listening too. I could make out enough stars to keep direction and went as far as I could that night. My intention was to return by the Sungei Chemor to the Larek mine and then to pick up my old track, but next day was cloudy and having no compass I somehow crossed over into the wrong valley and lost my way. For six days I wandered in the jungle, travelling hard during the daylight hours and lying up in a shelter of wild banana leaves at night. I had absolutely nothing to eat, but there was always plenty of water to drink and curiously enough I did not lose strength, though I became strangely light-headed as if the top of my skull were a foot higher than normal. I went barefooted so that the Japs could not track me, but I seemed to be wandering in circles and several times ran into their patrols though on each occasion I managed to see them before they saw me.

As I was unsuccessful in finding any Sakai, for they had all fled into the mountains, I determined to go to the edge of the jungle and get help from the first Chinese I should meet. I did this, but unfortunately at that time the Japanese were carrying out one of their organized massacres in the kampongs of this area and the Chinese, though they gave me a little rice and salt, were unable to help me further. After that I returned to the Japanese camp from which I had escaped and followed their track right over the mountains to the neighbourhood of Jalong. From here I got on to my outward track, but had no sooner set off home than I went down with malaria and for two weeks I lay terribly sick in an empty Sakai house. A Jap patrol actually entered this house while I was there and set it alight, but I had prepared a bolt hole and managed to crawl away into the jungle.

At last I was fit enough to travel again, but being still unable to retrace my path I had to go out once more and get help from the Chinese. This time I got in touch with the guerillas and after spending a month recovering from fever in one of their small camps at the edge of the jungle near Ipoh, I was at last fit enough to travel and returned to Davis's camp at the end of July 1944 after an absence of three and a half months.[1]

In the first two years after the fall of Singapore, with the exception of the ancient and vulnerable Catalina seaplane, there was no aircraft available in the Far Eastern theatre of war which was capable of flying from our nearest base (in India or Ceylon) to Malaya, dropping its load of stores or "bodies," and returning. That was why Davis and Broome had had to come in by submarine and even then only Dutch submarines had been available. But by the beginning of 1945 the new Mark 2 Liberator had reached India and once we had established wireless communication with Ceylon it was a fairly easy matter to arrange a "drop." On the last day of February 1945 two Liberators flew over and dropped four "bodies" and a vast amount of stores on the level

[1] Nothing, I am sorry to say, has since been heard of Pat Noone.

tin-mining area at the jungle edge outside our camp. Unfortunately I was recovering from a severe attack of tick-typhus at this time and had to stay in camp, thus missing a most exciting moment as the little white mushrooms floated down in the still moonlight. We had to mobilize a hundred guerillas and as many Sakai to carry the stores up to our camp.

After this there was a revolutionary improvement in our health and it was wonderful to have books to read and to hear authentic news of what was happening in the rest of the world. Davis again met the representative of guerilla headquarters and the terms of cooperation were reaffirmed now that we could at last substantiate our promises.

The next task was for Broome and me to get to the coast and to keep a rendezvous with a submarine at Emerald Bay, Pulau Pangkor Laut. We left our camp at the end of April 1945 and crossed the plains to the Perak river, where the guerillas had arranged for a sampan. We then slipped past Bagan Datoh in broad daylight and made our way across the open sea to our rendezvous. The submarine picked us up according to schedule and on May 17 we landed at Trincomalee. I had been out of circulation for three years and four months and had been officially reported "missing, believed killed."

I found that the organization which had started in such a small way before the fall of Singapore had now grown to enormous proportions. In Malaya alone, Liberators were daily dropping liaison officers and stores to the guerillas. By the time the surrender came there were fifty wireless sets sending out information night and day from the Malayan jungle, more than three hundred men had been dropped in and a vast amount of weapons and stores. There were three thousand five hundred guerillas fully armed and trained and as many more trained as reserves. Yet every time a Liberator went to Johore, for instance, the flight there and back was equal to a crossing and a half of the Atlantic, and if the dropping zone was not identified the 'plane had to jettison its precious cargo in order to be able to return safely to its base.

I myself managed to find an excuse to return to Malaya. In the Pahang area that I knew so well our liaison officers were not getting enough cooperation from the guerillas and, as I personally knew all the leaders concerned, I felt that I could straighten the matter out. I had never done my parachute course, but it is obviously so unpleasant to drop through a hole in the bottom of a 'plane that it seemed to me there was no point in doing it more often than necessary, so on 26 August 1945 I did my first "drop" near Raub and joined the Force 136 officers who were already there. We emerged from the jungle some months before the occupying troops arrived and had some difficulty in persuading the Japs that the war really was over.

Often in the small hours of the night I find myself wondering why I am still alive—I feel sure that some of you are now asking the same question—and the answer to that is in some ways the main justification for reading a paper of this sort to the Royal Geographical Society. On Gino Watkins's second Greenland expedition our motto was: "There is nothing either good or bad but thinking makes it so." And that, I am sure, is the answer. It is the mental attitude that matters and the knowledge of what the human frame can stand. There is one school of thought—that of the six British soldiers of whom I have already

spoken—who see the jungle full of innumerable visible and invisible horrors—scorpions, snakes, and centipedes, deadly fevers, ferocious wild animals, and hostile natives. Then there is another, who think that the jungle is teeming with game, fish, and edible roots and fungi, and that bunches of bananas and pineapples drop into one's lap. Both these viewpoints are equally false; but the jungle does provide unlimited fresh water and cover where Englishmen as well as Japs may hide. It is the attitude of mind that is all important: the jungle itself is neutral—though admittedly it is an armed neutrality.

DISCUSSION

Before the paper the PRESIDENT (The Rt. Hon. LORD RENNELL OF RODD) said: To-night we are to have a paper by Lieut.-Colonel Spencer Chapman on his experience behind the enemy lines in Malaya. We are happy and fortunate in having with us his Commander-in-Chief, Admiral Viscount Mountbatten of Burma. We shall, I hope, hear from him after the paper has been read. Colonel Spencer Chapman is well known to our Society as an explorer, mountaineer, and ski expert: he is also a great soldier. Apart from being these things, he is a humanist and his interest is, as ours will be to-night, in the people who took part in these exploits and with whom he associated.

Colonel Spencer Chapman then read the paper printed above.

ADMIRAL VISCOUNT MOUNTBATTEN OF BURMA: Mr. President, Ladies and Gentlemen—In the course of the last five years I have received a number of reports from men who have returned from commando raids or from operating with Wingate's columns behind the Japanese lines in Burma, from agents of the Secret Service which we used in the Far East, from members of Force 136, an organization to which Colonel Spencer Chapman was subsequently attached, and from men of various other organizations carrying out dangerous missions in enemy-occupied countries. I thought I was fairly inured to hearing tales of this sort, but this is something greater than any I have previously heard. There is no one incident that Colonel Spencer Chapman has related for which I could not find a parallel in other accounts given me by those engaged in similar operations: the difference is that he succeeded in having not one such adventure but a whole series of adventures lasting not days nor weeks nor months but literally years. In that respect I very much doubt if anybody else could equal his adventures or his achievements. I am proud to notice that he is still wearing the S.A.C.S.E.A. flash, representing the Phoenix rising again from the ashes of South-east Asia, which was reserved for forces and troops under the direct command of the Supreme Allied Commander.

When Colonel Spencer Chapman came out from Malaya in May 1945 he immediately volunteered to return there when the great invasion took place. We had the operation planned and ready for a D-Day of 9 September 1945; it was the greatest invasion that was to take place in South-east Asia. The fighting force comprised seven infantry divisions, a parachute brigade, a commando brigade, an airborne brigade. They were to have landed at Port Swettenham and Port Dickson. The Japanese at that time had no idea when we were coming or where we would land but they expected a great force. In South-east Asia there were nearly three-quarters of a million Japanese—738,000 to be exact. They had only 130,000 in Malaya. Against them we were coming with a quarter of a million troops. The 130,000 Japanese troops were so disposed that, again by pure chance, only one battalion was anywhere near the area in which we were

going to land. We know from General Itagaki, who commanded in Malaya, that his Intelligence Staff told him that we could not land during the south-west monsoon so that he need fear no invasion until the end of October. We landed on 9 September 1945 as planned, and we knew it would have been a complete walk-over. What would have helped us most would have been disorganization behind the Japanese lines by guerillas—Chinese and the Malayan People's Anti-Japanese Army. Colonel Spencer Chapman has told you that we had put in three hundred British officers and others, and there is no doubt that with that organization to back up our landing we should have cleared Malaya of the Japanese in a very few weeks. We had estimated that we would have Singapore in our hands before the end of October 1946, but because of their assistance it might even have been earlier.

One of the difficulties in regard to these operations such as Colonel Spencer Chapman carried out is that no suitable decoration has yet been invented as a reward. I know of only one other case of a man whom I felt had earned the highest possible award and that was Major Seagrim who led a similar party among the Karens of Burma and finally gave himself up because the Japanese were torturing the people in the neighbourhood. There was considerable difficulty in obtaining for him the George Cross which was ultimately posthumously awarded him. Colonel Spencer Chapman was awarded the D.S.O. and later a bar, and I remember asking at the time whether it was possible for him to be given the Victoria Cross, but I discovered that it was not possible because of the very strict regulations governing its award. The Victoria Cross has to be awarded for a particular act of gallantry witnessed by several people. This is not a case qualifying for the Victoria Cross; this is a case of courage shown by one man completely on his own, not on one day but on many days over years. I regret that it is not possible at present to recognize the great difference which exists between these two forms of courage.

I happen to know a little about Colonel Spencer Chapman because my nephew, Philip of Greece, was at Gordonstoun School where, he told me, Colonel Spencer Chapman had previously been a master. It appears that in those days before the war his adventures in the Arctic, in Tibet, and elsewhere had made him a legendary figure among the schoolboys. His room was a veritable museum of everything a schoolboy could be thrilled by.

I conclude by expressing, I am sure on behalf of all present, our great appreciation of what we have heard to-night. I am certain that it is men of the calibre of Colonel Spencer Chapman and the deeds they do which help more to restore our prestige than anything else. The great invasion of Malaya would have won back our prestige. The atomic bomb could not do that, but these men who were left behind, or, as Colonel Spencer Chapman put it, stayed behind, maintained our prestige and did more single-handed than a whole division of the British Army could have achieved.

The PRESIDENT: After what you have heard from Colonel Spencer Chapman and from his Commander-in-Chief, further comment would be out of place. It seems to me we should carry away in our minds from such an account the concluding phrase of Colonel Spencer Chapman's lecture when he quoted Gino Watkins to the effect that "there is nothing either good or bad but thinking makes it so."

FARMING IN IRISH LIFE

T. W. FREEMAN

Afternoon Meeting of the Society, 17 March 1947

IRELAND LACKS a general land utilization survey comparable with that of Great Britain, though 1-inch-to-the-mile maps are being compiled for the whole of Northern Ireland and some fragments of Eire. This article must therefore be of a tentative nature as it is based largely on the statistical materials available, on various studies dealing with particular aspects of the agricultural life of the country, and on the field work of the author, his students, and members of the Irish Geographical Society. The treatment rests on a recognition of the economic difference between Northern Ireland and Eire at the present time, and on a correlation between the actual size of farms and their economy, followed by a summary account of the agricultural production and an assessment of the connection between farming and the population problem. No attempt is made to romanticize rural communities who, in many cases, live in conditions of considerable hardship though they are unquestionably more fortunate than their predecessors of fifty or a hundred years ago.

As more than one-third of the Irish population depends directly on agriculture for a living and the landscape is primarily rural rather than urban, it is reasonable to regard farming as the key to the country's social geography. The agricultural problems of Ireland may be viewed historically, politically, and commercially and, perhaps most important of all, in terms of social welfare. Safety lies in the consideration of commercial factors alone, but such an approach is entirely inadequate in a country with a stormy political history, much of which has centred around the occupation and ownership of land and the difficulty of making a living. Contemplation of the Irish rural scene may lead to such despairing comments as that of C. H. Oldham [1] who wrote in 1914 that "the pitiful 11·1% devoted to ploughed land offers no adequate basis for the employment of the agricultural population . . . in the arts of using a most fertile soil in the business of agriculture, Ireland is but a ruined land, wasted and withered by the fifty-years-long struggle to settle the question of land tenure." Even so, a true assessment of the country's life demands the recognition of its agricultural basis, as Ireland lacks the concentrated industrial development seen in such areas as the West Riding of Yorkshire, parts of Lancashire, or the Black Country. Only in and around Belfast is modern heavy industry superimposed on a primarily agricultural foundation; elsewhere the factories exist chiefly to process agricultural staples or to meet the needs of rural communities. Even the great linen industry of the north-east has risen on a basis of flax growing and processing on the actual farmsteads.

[1] C. H. Oldham, 'Oxford Survey of the British Empire,' vol. 1, pp. 457–8, Oxford, 1914.

Effect of political division

The division of Ireland into two political units in 1921 has had important effects on agricultural production. Northern Ireland, which consists of six of

Figure 1

the nine counties forming the historic province of Ulster, has no customs barrier with Great Britain and therefore has unimpeded access to the British market subject only to the exigencies of sea transport. As a population unit it has more than half of its people in towns, and the farming community has a considerable home market almost at its doors. In the war of 1939–45,

Northern Ireland shared the intensification of agricultural production that was so marked a feature of British farming; fertilizers were available, subsidies provided, labour produced, and the arable acreage almost doubled. The net result was so marked on the farms that, to quote visitors, "Northern Ireland became a cultivated garden." In the remaining twenty-six counties, known as the Free State from 1921 to 1937 and since then as Eire,[1] the war added to the difficulties of the farmers. Locally known as the "emergency," the war resulted in diminished supplies of fertilizers, an attenuated transport service through the lack of imported coal and petrol, and a quickening of emigration, especially from rural areas, through the appeal of service with the home and British forces and of warwork at high wages in Great Britain. At the same time the farmers were urged to grow more wheat, sugar beet, and other crops demanding labour and fertilizers, in order to maintain food supply at home. The search for fertilizers led to the mining of phosphates in the west of Co. Clare at considerable expense, but so limited were the supplies that a government spokesman told farmers to "draw on the inherent fertility of the soil." Asked to produce more with less nourishment for the ground and, in many cases, an inadequate labour supply, the farmers of Eire might well speculate on the cost of neutrality in spite of the high prices. Two comments may be made here; first, the people of Eire as a community could not be drawn into the war merely on account of any economic advantages that might accrue, whatever the reactions of individuals might be, and second, the war made the division between the two political parts of Ireland sharper than ever before, with the result that there is not one agricultural unit in Ireland but two, with a widening gulf of experience between them.

Implanted on the Irish scene therefore is a Border of recent origin which has gained strength as a line of demarcation in the present phase of history. It runs over most of its length through closely settled agricultural country in which no natural barrier is apparent, and in many instances passes through actual farms where, it is said, cattle have been known to graze on one side in the evening and on the other the next morning; their movement is influenced by the comparative prices on each side so that the lean kine may become the fat kine on occasion. The Border as a natural divide has no more validity than any group of county boundaries passing through the English lowland. Though an economic divide, it marks no striking change of landscape, as the highly-fragmented farm scene persists on each side. The division of the land into farms of various sizes is a crucial factor in Irish agricultural life and provides one possible basis of regionalization; it is therefore to the farm pattern that attention will now be given.

Farm size and economy

There are three classes of farms commonly recognized in Ireland, small, medium, and large, consisting respectively of those covering 1–30, 30–100,

[1] The term Eire is ambiguous as it is the Irish for Ireland. Government statistical publications dealing with Eire state that "the figures in this publication relate to the area which was comprised in Saorstat Eireann (the Irish Free State) and excludes the Counties of Antrim, Armagh, Down, Fermanagh, Londonderry and Tyrone and the County Boroughs of Belfast and Londonderry. Under the Constitution of 1937 the name of the State is now Eire, or in the English language Ireland."

and over 100 acres. This classification will seem strange to readers outside Ireland accustomed to expect larger units; nevertheless, 56,000 out of 88,000 holdings in Northern Ireland (63%) and 186,000 out of 327,000 in Eire (57%) are of less than 30 acres.[1] In many cases a farmer will have more than one holding; thus in Eire the number of farmers recorded at the 1936 Census was 259,000 and the statistical disparity of 70,000 is due to several factors, including cases of farmers possessing more than one holding, the inclusion of sports grounds or grounds around houses, and, on the other hand, to the ownership and actual working of land by people who do not return their main occupation as farming. A recent investigation in Co. Kilkenny revealed that 15% of the area studied was owned and worked by people who were not primarily farmers but shopkeepers and others.[2] These considerations do not invalidate the conclusion that a considerable proportion of the rural population both in Northern Ireland and in Eire are living on small farms. Fig. 2 gives a general view of the prevalence of each type of farm through the country; it has been so compiled that uninhabited rural areas are left vacant as far as possible. In Eire, the 1936 statistics of the number of farmers of the small, medium, and large units have been plotted for each Rural District and therefore the map covers the area actually farmed whether in one holding or more; in Northern Ireland statistical exigencies have resulted in the mapping of the actual holdings, of which there are 88,000 occupied by 60,000 farmers. It has not been possible to use Rural Districts as a basis in Northern Ireland as figures are available only for counties. In spite of all these limitations certain general conclusions emerge: the prevalence of small farms in the north and west of the country; and the admixture of farm units of all sizes over the greater part of Eire south of a line from Galway Bay to Dundalk.

Farmers in the old Ulster province, which includes Northern Ireland and the adjacent counties of Monaghan, Cavan, and Donegal, have the traditional "tenant right" of continued occupation of their holdings so long as they pay the rent and of the sale of their interest when the land is transferred to another holder. In the three other provinces, Leinster, Munster, and Connacht, the landlord had considerable powers of eviction until the various Land Acts began, from 1870 onwards, to transfer the farms to the tenants under various purchase schemes.[3] The tradition of arable farming is best established in the north, for the Ulster farmer, possessing greater security of tenure, sowed his crop knowing that he would also reap it, whereas the tenants elsewhere kept all possible property in a transportable form. Cattle, sheep, and pigs could if necessary be driven along the roads with the family in the event of eviction and all would settle down as squatters on some waste patch of land. The landlords are now almost eliminated under the land-purchase schemes that have made the farming population a community of actual or potential owners. The land purchase Acts also enabled the Congested Districts Board (from 1891 to 1923) and the Land Commission to acquire land for allocation to "uneconomic

[1] Northern Ireland figures are for 1946, Eire figures for 1936. See note under Fig. 2.

[2] T. W. Freeman, "The Graiguenamanagh basin," *Bull. Geogr. Soc. Ireland*, vol. 1, No. 3, pp. 61–77, Dublin, 1945.

[3] An admirable summary of land tenure problems is given in E. R. Hooker, 'Readjustments of land tenure in Ireland,' Chapel Hill, N. Carolina, 1938. See also the Annual Reports of the Eire Land Commission.

Fig. 2. Distribution of farms in Ireland by size

This map is based on 'Eire, census,' vol. 2, "Occupations," pp. 214–53, Dublin 1940, and 'Northern Ireland, annual report upon the agricultural statistics, 1929–30,' Belfast, 1931. The dots have been placed as far as possible in the areas actually farmed; gaps include the major uplands and uncultivated peatbogs in the central lowlands. While small holdings are the dominant type in Northern Ireland, many farmers have more than one and in economic terms are holders of medium-sized farms. Note that there are statistical discrepancies between Eire and Northern Ireland (footnote 1, p. 41)

holders" (those having very small farms), migrants from congested areas, former estate employees, evicted tenants, and others; in all, one-tenth of the entire area of Eire has been re-settled and the Land Commission is still allocating approximately 20,000 acres per annum to the less fortunate. Many of the parklands (demesnes) around great houses have been settled in this way; some have been turned over to the Forestry Commission and a few to religious communities for educational and social purposes, but most of the surviving owners are under the closest scrutiny by those conscious of land hunger. The fate of the demesnes is in fact highly varied but to some extent the Georgian dichotomy of wealth inside the park gates and poverty outside them has been at least partially lessened.

The two major areas dominated by small farms, the north and west, differ markedly in their productivity and standard of life. The northern farms are intensively cultivated with as much as half their land at the present time in arable crops, including some which give a substantial return, such as flax, grass seeds, and potatoes for seed and for the market. The farms of the western seaboard and some neighbouring areas such as central Mayo are little more than subsistence holdings on which many workers have to find some additional source of income such as labouring, either locally or elsewhere in Ireland, seasonal migration to various parts of Great Britain, or remittances from relatives abroad. Fifty years ago when the Congested Districts Board began its work and gathered material on the poorest areas of the land, a state of near-subsistence was revealed not only along the Atlantic coasts but also in the almost equally closely-settled districts of Co. Mayo, Co. Sligo, and Co. Leitrim which still have an unenviable reputation for poverty.[1] Now however almost every farm has a considerable quantity of produce for sale, and therefore in Fig. 3 the term "cottage farming" is suggested for the admittedly poor and still somewhat overcrowded districts which correspond to the "crofting" areas of Scotland.

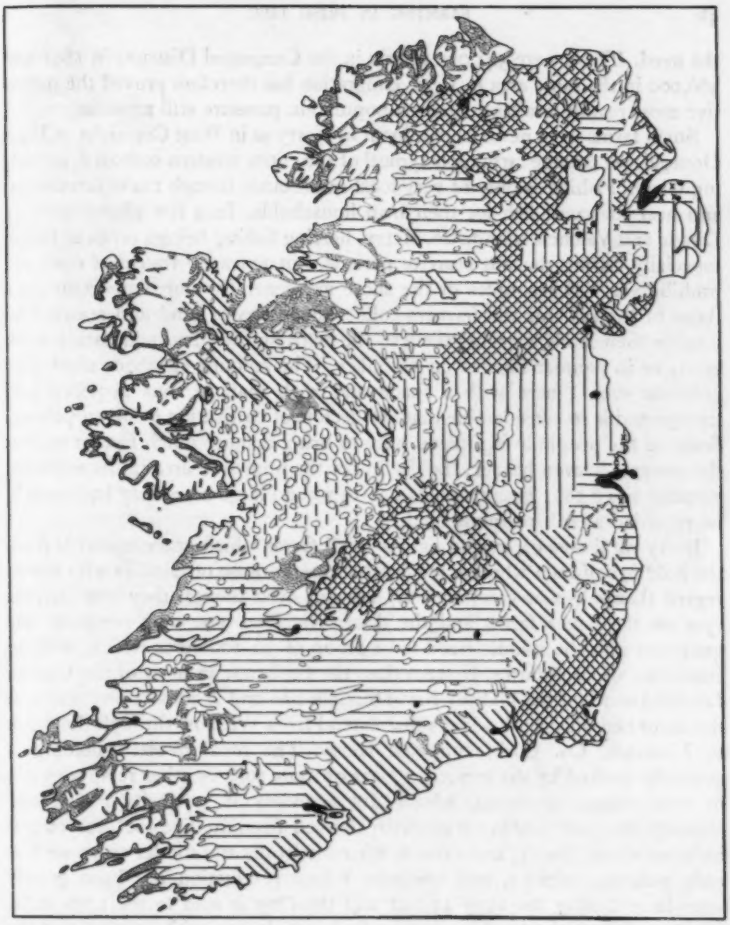
The smallness of the Ulster farms is due partly to the traditional dominance of flax cultivation, combined with home processing of the crop before the linen trade became a factory industry in the middle of the nineteenth century. To this day flax retting troughs are a frequent feature of the Ulster scene and many mills, some still in use, exist to begin the complicated processes that are necessary before the flax reaches the spinning mill. Formerly the farm family derived nearly all its income from linen and needed only a small area to grow its flax with some food and fodder crops. At present flax growing is liable to rapid expansion and contraction according to prices; large quantities have been grown during the war but some of the farmers have threatened that they will not grow the crop at all in 1947 unless the Government guarantees better prices. The general intensity of production makes the northern farm profitable and many of the holders acquire extra land, in some cases with a view to allocation among their sons when they reach manhood. In Ulster also the sale of land is rather more frequent than in the other provinces.

[1] W. L. Micks, 'An account of the constitution, administration and dissolution of the Congested Districts Board from 1891 to 1923,' Dublin, 1925, is a valuable review of conditions in the west of Ireland; see also T. W. Freeman, "The congested districts of western Ireland," *Geogr. Rev.* 23 (1943) 1–14.

Farming in the Congested Districts is far less specialized than in Ulster; at its poorest it gives a standard of living humbler than that found anywhere else in the British Isles except possibly in the western highlands and islands of Scotland. In the extreme north-west of Donegal the average farm size is only 8 acres, in south-west Donegal 14 acres, and in West Connacht 10–20 acres. The few fields are pasture, meadow, or patches of oats and potatoes; the stock consists of one or more cows and sheep, a few pigs, and a surprisingly high number of poultry. All the rough pasture is used as far as possible, even for cows; in addition it provides fuel for the homestead and cattle bedding. The lowland south of the Ox mountains, and a belt of country stretching from Donegal Bay into Co. Leitrim, also have similarly small farms whose holders concentrate mainly on young cattle, poultry, pigs, and butter making. The apparent poverty is alleviated dietetically by the consumption of butter and bacon at home and also by seasonal migration to which a certain amount of home industry, chiefly knitting and embroidery, is added in Donegal. But in spite of all the improvements of the past fifty years, which include the enlargement of many holdings, the provision of better roads and transport facilities, and the increased returns of seasonal labour, the long-recognized "congestion" survives. Palliative measures include planned migration to areas in the eastern part of the Central Lowland where some large estates have been divided among "congests" from the west; in the Gaeltacht Commission Report [1] the hope was expressed that congests from the western Irish-speaking districts, by their settlement in the richer eastern districts, would spread the use of the native tongue among their new neighbours. A great social and economic gulf is however fixed between the resettled holders of 25 acres and the farmers of more than 100 acres in Co. Meath, and the schemes have not only proved expensive but have led to local friction.[2]

Many of the efforts to reorganize farms within the congested areas themselves have proved equally costly; a few examples must suffice. A townland of 1 square mile in Co. Mayo had one thousand five hundred plots of land owned by fifty-six people, among whom one farmer had 2 acres in eighteen plots and another 14 acres in thirty-five plots.[3] Readjustment was begun under the Congested Districts Board in 1918 and completed by the Land Commission in 1942; the number of holdings was reduced to thirty-two, and the remaining families migrated either to lands in Co. Meath and Co. Kildare under the resettlement schemes mentioned above or else to land near Ballina, Co. Mayo. The cost included the services of a succession of inspectors, endless incidental expenses, and finally a government grant of £150 and a loan of £50 to each family to build a new house. Again, at Cloosh, Co. Galway, six farms of 30–40 acres with houses, roads, and some common land were provided at a cost of £8000; at Ballycroy, Co. Mayo, ten holdings of around 50 acres with common grazing cost £6000 and two new farms in Co. Donegal cost £2200. As much of the cost must be a state benefaction, reorganization of this character cannot meet more than a small proportion of

[1] *Coimisiún na gaeltachta*: Report, Dublin, 1926, pp. 45–6.
[2] *Irish Times*, Dublin, 23 October 1943.
[3] *Irish Times*, Dublin, 12 January 1943; there are other examples of land division in the Reports of the Land Commission.



Mixed farming with considerable tillage

Mixed farming with stockraising and feeding for the store cattle trade

Grazing and fattening country with some highly specialized large farms

Dairying predominant, mainly for creameries, milk supply near towns

Sheep raising and fattening with some stock raising

Cottage farming

Peat bogs and mountain pastures, mainly uninhabited

Market gardening

Towns with over 10,000 people

Fig. 3. Farming types in Ireland

the need. There were 541,000 people in the Congested Districts in 1891 and 366,000 in the same area in 1936; emigration has therefore proved the palliative most readily available, though population pressure still remains.

Small farms were never as dominant in Kerry as in West Connacht or West Donegal, yet cottage farming is typical of the entire western seaboard, including Clare. Fishing is only of very local importance though many farmers on and near the coast fish for their own households. In a few places, such as Dingle and Valencia island, Co. Kerry, herring fishing brings profit at times, especially during the war scarcity periods, but normally transport costs are prohibitive. The resources of the shore are generally more important than those of the sea, for the farmers collect quantities of sand and seaweed to manure their lands, carrying them to the fields on their backs in basket-work creels or in pannier baskets on a donkey. The amount of labour needed to cultivate even 1 acre with a spade and with manure thus acquired and transported is so considerable that the decline of cultivation is not surprising. Some of the people living inland have to bring manure much farther so that the struggle is even harder; the decline of the improved area in the seaboard counties since 1871 is as much as one-third and large areas may legitimately be regarded as sub-marginal land.[1]

Every rural area of Ireland has its small farms which grade upwards from the holdings of men who are really labourers to those of families who would regard themselves as comparatively affluent even though they cast envious eyes on the larger farms and the demesnes. Here one may recognize the gradation into the middle-sized farm group of 30–100 acres which, with an admixture of large farms, characterizes the landscape in most of the Central Lowland south of the Galway Bay–Dundalk line and is equally prominent in the mountain-studded lowlands that extend from Wicklow through the south to Limerick, Co. Cork, and east Kerry. The medium-sized holding is generally worked by the farmer and one or more sons or other relatives with, in some cases, employed labour. Its economy is normally mixed and although the main profits are generally derived from the livestock the output includes wheat, barley, and various other foodstuffs and fodder crops such as oats, potatoes, turnips, and mangels. Wheat production has been greatly stimulated during the 1939–45 war and the crop is sold to the corn mills. Barley and sugar beet, where grown, find a ready sale with brewers and the Eire sugar factories; oats are generally milled locally and in many cases returned to the farm for the household or stock. In Northern Ireland, flax and grass seeds are also important and to some extent these prevail throughout the old Ulster province. The amount of land given to each of these crops varies from year to year: it was high during the 1914–18 war, fell to a low level in the early nineteen-thirties, and then rose in response to government propaganda which became compulsion after 1939.

Finally, many of the large farms are far more specialized than the medium-

[1] The actual declines from 1871 to 1944 in counties along the western seaboard are: Donegal 36%, Sligo 8%, Mayo 20%, Galway 24%, Clare 13%, Kerry 31%. It was around 1871 that most counties recorded their maximum extent of "improved land," officially defined as "under crops and pasture." Most of the more favoured counties in the Central Lowland and the south still have as much improved land as in 1871. It is the less desirable areas that have been abandoned.

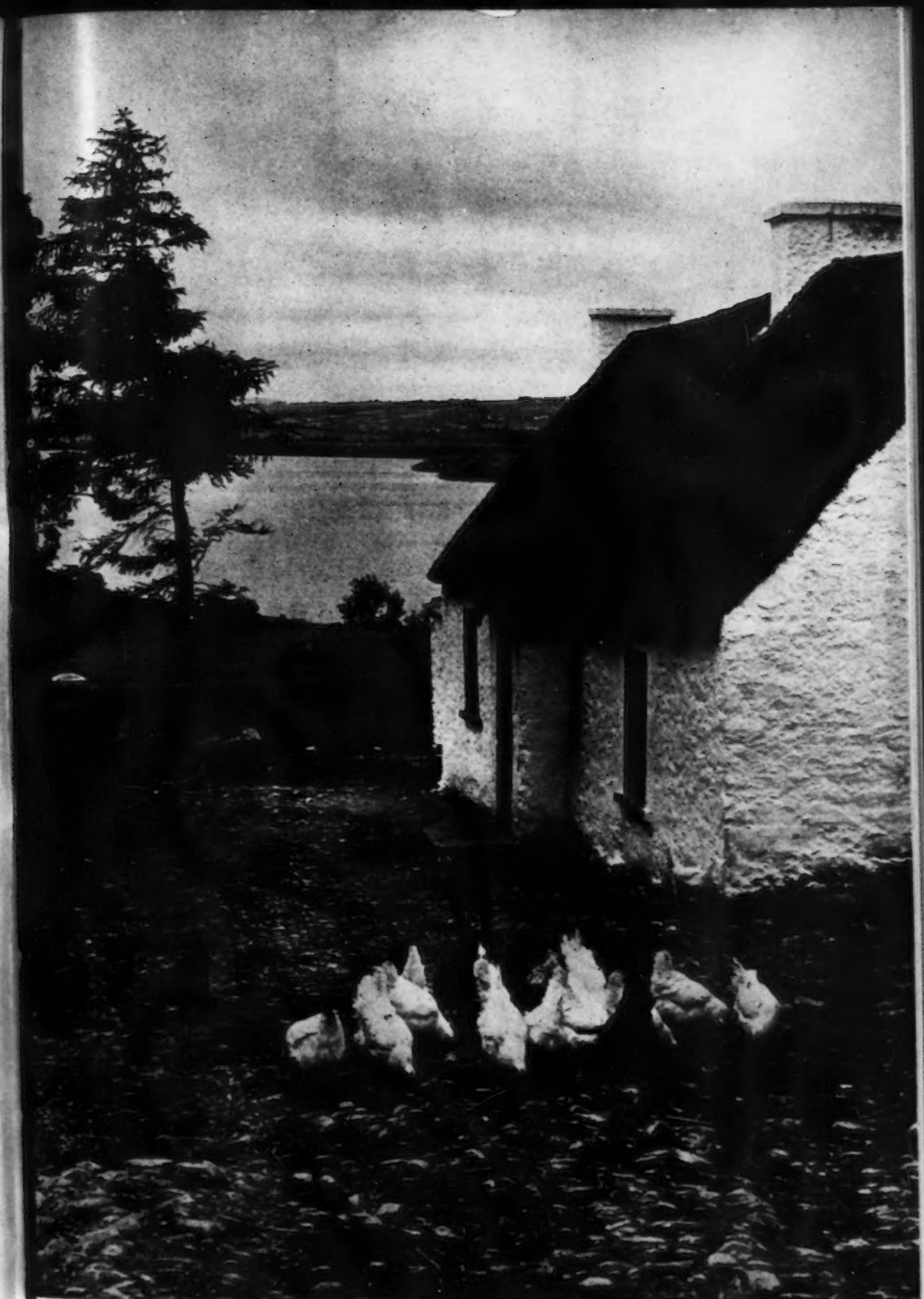


Photo. Irish Tourist Assoc'at

Farmhouse at Lough Gowna, Co. Cavan

Monthly fair day at Cashel, Co. Tipperary

Milk on the way to a creamery, Co. Limerick

sized or small farms, preparing cattle for meat markets or providing grazing for stores before trans-shipment. As a group however the large farms include a number of mixed economy and a number, especially in and near the various uplands, specializing in the rearing and fattening of sheep.

Agricultural production

Cattle production in Ireland shows an economic integration made possible by the strength of the export trade to Britain.[1] Both in Northern Ireland and in Eire the small farms produce more calves than they can bring to maturity, and the surplus is sold at fairs to the holders of the medium-sized farms who feed them for a few months and then pass them on to the holders of the larger farms, who in their turn prepare them for the meat markets of the Irish towns or for export. Most of the cattle exported to Great Britain go as stores destined to spend the last few months of their lives on some of the richer English pastures. Ireland's position in the store cattle trade is comparable with that of Wales or Scotland, for all supply cattle to replenish dairy herds or to stock fattening pastures. In Northern Ireland most of the cattle born on the smaller farms pass through two or three medium-sized holdings, staying on each for a few months, before reaching the larger farm from which they proceed to the Belfast abattoirs or the shipyards. A similar movement is characteristic of Eire; the destination is the large farms of Co. Meath and Co. Kildare and, to a lesser extent, the comparable farms near Cork, Waterford, and Limerick. An animal may be sold two or three times during its lifetime at various fairs in which dealers figure prominently, prices fluctuate sharply, and various abuses exist. One enterprising family known to the writer has circumvented all these disadvantages by establishing a chain of farms from the Shannon eastwards through which they move their cattle towards Co. Meath and the Dublin market. Store cattle normally account for one-half of the export trade by value from Eire, but only one-tenth of that from Northern Ireland which has a greater home market and is famed chiefly for its industrial exports. Normally the exports of fat and dairy cattle together are valued at hardly one-quarter of the store cattle overseas trade.

Dairying in Ireland interpenetrates with store cattle raising on many farms but has become the main specialization of certain areas, notably the Munster lowlands and the lowlands stretching inland from Donegal Bay.[2] It is also important around Belfast and Dublin for local milk supplies. Like the store cattle trade however, dairying is associated with the vast majority of the farms in the country and depends partly on the supply of calves from small farms. The high degree of specialization achieved in the areas specified above is generally ascribed to the success of the creameries, which have established themselves firmly in the export butter trade, a trade which was already well developed in the eighteenth century and was valued at £2,000,000 per

[1] J. O'Donovan, 'The economic history of livestock in Ireland,' Cork, 1940, gives a full account of livestock and dairying; it is best used with John Hooper's classic account in 'Agricultural statistics, 1847–1926,' Dublin, 1930.

[2] See a series of papers by M. Murphy dealing with farm accountancy on a group of mixed dairy farms in North Cork and Limerick, in the *Journal* of the Statistical and Social Inquiry Society of Ireland, vol. 16, 1938–39, 105–126; 1939–40, 90–93; 1941–42, 60–87; vol. 17, 1943–44, 269–308.

annum early in the nineteenth. The original export was of home-churned butter in "firkins" of 70 lb. weight, sent mainly from Cork. As the firkins were generally filled by several farmers and the quality of the butter was unpredictable, Dutch and Danish competition was felt very severely in the 'seventies and 'eighties. The first creameries were established between 1885 and 1890 in the Golden Vein[1] and many more were established both in Munster and Ulster before the end of the century.[2] At first the flavour of the creamery butter was compared to "a raw swede turnip cut in two" but opposition to their development failed and the firkin trade is now practically extinct. Three types of butter are made in Ireland, farmers', factory, and creamery. Farmers' butter is sold, if at all, locally or to the factories. Factory butter is defined as "butter which has been blended, re-worked, or subjected to any treatment, but which has not as a result ceased to be butter." Most of the butter factories in Cork and Limerick now make creamery butter. The export trade in butter from Eire was valued at £1,600,000 in 1939, but hardly existed at all by 1945 owing to decreased milk supplies. Northern Ireland is approximately self-supporting in butter.

The original inspiration of the creamery movement came from Denmark and is associated with the names of Sir Horace Plunkett and the Rev. Fr. Finlay, S.J., whose work is carried on by the Irish Agricultural Organization Society. Essentially cooperative in action, the creameries provide a means of processing raw materials and have therefore carried industry into the countryside. Their strength is greatest in such areas as Limerick, Tipperary, north-west Cork and north Kerry, where almost all the farmers supply milk, and their extension eastwards into Kilkenny and Waterford is perhaps a sufficient tribute to the economic advantages they bring to a farming community. They have not so far been conspicuously successful in attracting the allegiance of the small farmer, as he generally has too few cows to guarantee a daily supply. In addition, the lack of winter feedstuffs under a predominantly pastoral regime makes the milk supply seasonal; many publicists on Irish agriculture wish to encourage winter dairying on Danish lines and hope that milk production will ultimately dominate such areas as the "tillage districts" of the Midlands (chiefly Co. Leix and Co. Offaly) and of Co. Wexford which also has a considerable arable acreage.[3] The holders of medium-sized farms remain staunch supporters of the creameries; but many of the holders of small farms in counties such as Clare, and to some extent those in Northern Ireland, have either not been drawn into the creamery network at all or else have supplied the creameries so sparsely that they are rather struggling concerns. In other words, the agricultural regeneration envisaged by the

[1] The Golden Vein (sometimes called the Golden Vale) consists of the lowlands of Co. Limerick with an eastward extension towards Tipperary and Cashel and a southward extension to the neighbourhood of Charleville and Mallow. In effect it is the heart of the Munster dairying country.

[2] Cooperation is discussed in 'Agricultural co-operation,' published by the Horace Plunkett Foundation in 1931, and in the periodic issues of the 'Year-book of agricultural co-operation.' The annual *Irish Industrial Yearbook*, Dublin (not official) summarizes the available statistics and lists of factories including creameries.

[3] The comparison between Eire and Denmark is treated by J. P. Beddy in *J. Stat. and Social Inquiry Soc. Ireland*, 17 (1943–44) 189–220.

advocates of the creameries has not been conspicuously successful in reaching those who need it most.[1]

Pig rearing is mainly a small farm concern in Ireland and is associated with many of the poorest holdings but also to some extent with the creamery districts. The pigs are fed on skim milk from the creameries or left over from home butter making, with cooked potatoes and imported maize meal. As the last was unobtainable in Eire during the later phases of the 1939–45 war, the number of pigs declined by 60%, the bacon factories had no surplus for export, and the home market was so inadequately supplied that many people received less bacon than their rationed relatives in England. The pre-war bacon trade was however expanding both in Eire and in Northern Ireland, where a successful marketing scheme initiated in 1931 led to an increase in the number of pigs from 220,000 to 630,000; consequently, imports from Eire ceased and the export trade with England increased in value to £1,000,000 per annum. During the war years 1939–45, the number of pigs in Northern Ireland declined to 240,000, but in 1946 the number increased to 310,000. The pre-war bacon export of Eire covered half the output of the factories and was worth about £2,400,000 per annum. The chief factories are at Waterford, Cork, Limerick, and Tralee (Co. Kerry) in Eire, and at Belfast, and there are several others in provincial towns. The British demand is for "Wiltshire" bacon from well-ribbed and long-sided animals (Large White "Irish" Yorkshire) reared in Munster, Leinster, and Connacht. The Large White Ulster pig which gives "Irish roll" bacon has been supplanted in the north by the potentially Wiltshire animal.

Poultry rearing has increased threefold in Ireland during the past hundred years and is of special economic importance on most of the small farms of the country; but there are few poultry farms. In 1939 there were some 20,000,000 poultry in Eire and 10,000,000 in Northern Ireland; one-third of all the eggs from Eire and half those from Northern Ireland were exported. In 1939–46 the numbers of poultry doubled in Northern Ireland, halved in Eire. Table poultry are also remunerative and turkey production for British markets is heavy, especially around Christmas. Turkeys are however regarded as a sporting or speculative venture by most farmers' wives as they are difficult to rear, but they may be seen foraging for food in most Irish farmyards or even country lanes and are much less intensively and expensively fed than Norfolk turkeys. They are sold mainly through dealers or, in Northern Ireland, at special "turkey markets" held before Christmas. Other birds bred for sale include ducks, geese, and guinea fowl. The last have recently appeared in large numbers on many farms and are sent to Britain at prices that seem fantastically high, for the ultimate cost to the consumer must be at least 5*s.* a lb. The fowls produced are of two types, surplus male birds and retired hens. The profits of poultry keeping are by custom given to the women for their personal expenses and household replenishments. Before the war the eggs exported

[1] At Mitchelstown, Co. Cork, the "creamery" is a large factory employing over two hundred people and producing butter, cream, and cheese. The surplus swill from these processes feeds several thousand pigs who are kept in an extensive piggery in the former demesne and are eventually sold to the bacon factories. Such developments are rare though they indicate a possible line of industrial evolution in the countryside. See D. V. Henning, *Irish Geogr.* 1 (1947) 97–101.

from Northern Ireland were valued at over £2,000,000 and the poultry at £500,000; the eggs from Eire brought in more than £1,000,000 and the poultry approximately half this sum. In 1946 both the eggs and poultry exports from Eire were valued at more than £2,000,000 and an even greater increase has been experienced in Northern Ireland. In 1946 the total value of the eggs produced in Northern Ireland was £6,700,000 and of poultry £2,500,000, but no figures of exports are available.

Sheep rearing, characteristic of all the uplands of Ireland, is combined with fattening on the lowlands, and the fat lambs and sheep are sold in the local meat markets or consigned to English industrial towns and holiday resorts during the summer months. In Northern Ireland there are now around 650,000 sheep and in Eire the number fluctuates around three to four millions. The main fattening areas include the lowlands and valleys of East Ulster, notably around the Mourne mountains and the Antrim plateau, and the hilly country, largely covered with drumlins extending from Co. Down to Co. Meath. Damp lowlands such as the Bann and Shannon valleys and many parts of the Central Lowland have very few sheep, but in East Connacht, where the Carboniferous limestones are thinly covered with drift and even form karsts, sheep are reared in considerable numbers; the pastures developed on the thin limestone soils are nutritive though the frequent outcrops of limestone give the country a somewhat desolate appearance.[1] In all the areas where sheep rearing and fattening is prominent, most of the farmers also possess cattle and grow some crops for the support of their households and stock.

As a whole, Irish farming is a mixed economy in which most farmers have a small arable acreage and a considerable area of pasture and meadow, and depend chiefly for their livelihood on some form of livestock with occasional cash crops. The store cattle trade and the creamery dairying have become well-recognized specializations of certain areas, but the core of the agricultural system is the economy of the medium-sized farms whose holders have a variety of stock and change their production from year to year according to circumstances. With these medium-sized farms must be grouped many smaller farms in Northern Ireland which have demonstrated their ability to increase their arable acreage and number of stock beyond all expectations. The "cottage farms" have however so limited a quantity of arable land that they remain dependent on pigs, poultry, calves, and sheep. Lying outside the creamery areas, they cannot profit from daily milk sales. The most specialized of all the Irish farms are the large holdings which in Co. Meath and Co. Kildare provide the final grazing and fattening pastures for the cattle drawn from the medium-sized farms. Hardly less specialized are some of the medium-sized farms, especially in Co. Limerick and Co. Tipperary, where some of the farmers normally have less than one-tenth of their land in crops and rely on the rich grass pastures and meadows to feed their herds. The very richness of the Irish pastures, especially on drift soils with a good lime

[1] See P. H. Gallagher and T. Walsh, "Characteristics of Irish soil types," part 1 (*Proc. R. Irish Ac.*, vol. 47, section B, No. 8, pp. 205–249, Dublin, 1942). This paper contains twenty-one examples of profiles and includes a discussion of recent work on soils in Ireland. It is obviously impossible to base a soil map on so few samples and a soil survey is highly desirable.

Hay crop with rough pasture beyond, Vale of Aherlow and Galtee mountains

Mixed farming landscape and River Nore near Inistioge, Co. Kilkenny

Cattle grazing in parkland, Co. Meath

Race horses on a stud farm at Mount Juliet, Co. Kilkenny

admixture under heavy rainfalls (everywhere over 30 inches per annum except in a small seaboard area from Dublin northwards), combined with the possibility of leaving cattle in the fields for as much as ten months each year, has militated against the intensification of Irish agriculture on Danish lines, for the farmer has no need to grow large quantities of crops to support the stock on which he depends as the grass grows so abundantly. Consequently the areas of the large grazing farms such as Co. Meath are held by "ranchers" who employ very little labour. In such areas the density of population is hardly fifty to the square mile.

Social factors

Population distribution in rural Ireland bears a very close relation to the type of farming practised.[1] At one end of the scale, Meath has 50 persons per square mile of improved land; at the other, western Donegal has 400 (Fig. 4). In other words, a square mile of the congested areas has as many as 60–80 farm households while Co. Meath has 4–6 with a few labourers depending upon them. In between lie the medium-sized farm areas with 10–20 farm households, a few labourers on the more prosperous holdings, and a population density of around 80–120 per square mile. Every gradation lies between the two extremes of Meath and Donegal, but comparison of Figs. 2 and 4 will show that the correlation stands over the whole of Ireland. Here an important contrast with English conditions emerges. The Agricultural Census of England and Wales, 1925, showed that the number of workers per 1000 acres was 24–26 whatever the size of farm. In Eire, 1000 acres of tiny farms (under 15 acres) "supports" 141 workers, of large farms only 18 workers. Even allowing that many of the holders of the smaller farms work on them only for part of the year and have various other resources, the contrast remains sharp.

Land distribution and the agricultural population in Eire[2]

Farm area in acres	*Percentage of improved agricultural land*	*Farm workers per thousand acres*	*Farm workers*	*Farmers*	*Relatives of farmers*	*Farm labourers*
				In thousands		
200+	15	18	31·3	5·8	5·8	19·7
100–200	19	28	61·4	17·5	20·1	23·8
50–100	25	41	118·8	43·1	48·5	27·2
30–50	18	59	122·6	53·7	54·5	14·4
15–30	16	82	148·4	73·1	66·1	8·2
1–15	7	141	115·0	62·7	48·3	4·0

[1] T. W. Freeman, "The agricultural regions and rural population of Ireland," *Bull. Geogr. Soc. Ireland*, 1 (1945) No. 2, pp. 21–30.

[2] Table is based on '*Saorstat Eireann*, agricultural statistics, 1927–1933,' Dublin, 1936, for area of land improved and 'Eire, census,' vol. 2, "Occupations," pp. 214–53, Dublin, 1940, for numbers of people. Women farmers are included but not other female helpers employed or belonging to the family unless they are returned as working on the land. It will be seen that relatives, for the most part unpaid, are more numerous than labourers except on the largest farms.

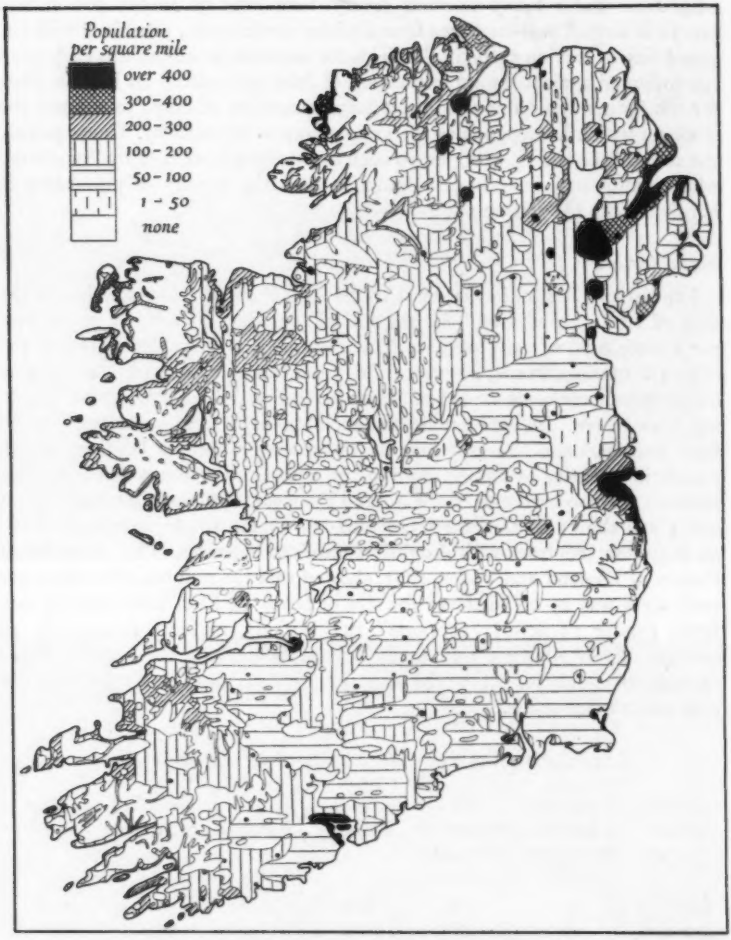


Fig. 4. Distribution of population in Ireland

This map is based on a series of dot maps compiled on a scale of $\frac{1}{4}$-inch to 1 mile from the detailed census figures for Eire (1936) and Northern Ireland (1937). The general correlation with Fig. 2 will be apparent: low densities are associated with the prevalence of large farms and conversely. The concentration of population in the restricted areas of settlement along the Atlantic seaboard and, hardly less, in some inland districts should be noted

Emigration is frequently regarded as the natural solution of such disparities, but fairly obviously they still exist after a century and more of outward movement in which the rural population has been reduced by 60%. In the past century, emigration has been heavy from every rural part of Ireland and there are still no signs of any cessation; on the contrary, the war of 1939–45 has accelerated the outward movement.[1] The social organization of the farm household is based on the assumption that some members of the family will emigrate, either to some other part of Ireland or "abroad" to Great Britain. One son, not necessarily the eldest, is given the farm and the rest are "educated" beyond the primary stage when means allow, frequently with a view to entering the priesthood, a religious order, or some lay occupation. A dowry will be provided for a daughter who will eventually marry a farmer or a townsman. Farmers at a humbler level will not be able to provide this secondary education and their sons and daughters will become labourers and domestic servants, but the children of the wealthier holders of large farms will in many cases graduate through the Universities and become in some cases professional workers: many of them find careers such as army officers. It is, in fact, impossible to settle the large families within the home area in rural Ireland and therefore emigration in some form remains necessary. In Northern Ireland considerable numbers are absorbed by industry and town employments; in Eire the number of workers in factories has risen by 40,000 since 1933 as a result of the industrial renaissance but only part of this labour force comes from the rural areas. Between 1936 and 1946 the population of Eire declined by 15,000, so that the total emigration was around 190,000 of whom about two-thirds came from the rural areas. Similarly, between 1926 and 1936, 179,000 migrants left the rural areas of Eire. The conclusion is therefore justified that the countryside cannot absorb its natural increase of population (about 6% in each ten years) and that the industrial expansion in the towns provides only a small amount of the employment needed by the emigrating rural population. At the same time there are signs of labour shortage in some districts, as many of the casual labourers have been drawn away into armies or navvying jobs, especially during the war.

There can be no doubt that the conditions of the rural population have improved vastly during the past hundred, and especially the last fifty years, in which the governments have possessed wide powers of acquiring land for redistribution and have steadily transferred the land to its occupiers. The enlargement of holdings still continues and the small farms are becoming less numerous; thus in Eire there were 75,000 farmers having less than 15 acres in 1926 but only 63,000 in 1936, and during the same ten years the number of farmers having 30–100 acres increased from 92,000 to 96,000. Again, the rehousing projects in both political units of Ireland have brought new cottages into most parts of the countryside and enabled many farmers to build new houses. The new cottages are at once less attractive to the eye and more convenient to the housewife than their thatched predecessors.[2] Further,

[1] See papers by present writer in *J. Stat. and Social Inquiry Soc. Ireland*: "Migration movements and the distribution of population in Eire," 1939; in Donegal, 1940; Kerry and West Cork, 1942; Mayo, 1943; Sligo, 1944; "Emigration and rural Ireland," 1945.

[2] Descriptions of the "peasant" houses and outbuildings associated with the farms are given in E. E. Evans, 'Irish heritage,' Dundalk, 1942.

the provision of roads with bus and lorry services has removed the inaccessibility of many farmsteads, though even now many farmers have to travel several miles to a town or even a village by donkey-trap or horse and cart for shopping or sale of stock at the markets and fairs. The communities remotely placed from towns and villages depend partly on the travelling salesman, who is not always a helpful influence in Irish life, as he works largely on a credit basis and is at once the buyer of agricultural produce and the seller of groceries and other household necessities.

Although the rural scene gives a picture of alleviated poverty, lessened congestion, and decreased population pressure, land hunger still remains. The "uneconomic holding" as it is generally known, or the farm that cannot support its occupiers without some extra source of income normally acquired from labouring or, in Donegal, some form of domestic industry, survives as a major social problem. The advocates of cooperation hope that cooperative buying and selling together with creameries and other industrial enterprises will eventually remove the middleman's profits and make the farming more remunerative. One cooperative society in a Congested District, Templecrone in the Rosses, Co. Donegal, has been conspicuously successful and its activities include the buying of eggs, butter, and other produce, the running of a large general store in Dunglow and also of a knitwear factory employing ninety people. But such developments are unusual and so far the cooperative effort is practically confined to creamery management. The middle-sized farms do not constitute a social problem; they have made the creameries successful, have responded vigorously to the demands for increased tillage, and are able to alter their output swiftly in response to changing economic conditions. Again, the density of population in the area they dominate indicates neither congestion nor the sparsity associated with the country of the "grazing ranches."

The farmers of Ireland feed themselves, supply the home market, and sell the surplus abroad; estimates for Eire show that before the 1939–45 war the total agricultural output was absorbed almost equally into these three main channels. During the war however the export trade fell to one-fifth of the output by value and the remaining produce was consumed, in approximately equal proportions, on the farmsteads and in the home market. No such figures are available for Northern Ireland, though there too it is known that the farming families rely largely on their own produce and support their livestock on it and that the home market claims the greater part of the remainder. The non-agricultural population has increased steadily in Northern Ireland and less markedly in Eire and the standard of living has so improved that the consumption within Ireland of meat, butter, bacon, eggs, and vegetables has expanded. Yet the prices of vegetables remain high in Eire and market gardens are surprisingly few in a country well adapted to produce excellent crops. Similarly, tomatoes, apples, and soft fruit are grown in very small quantities and only in a few areas round the major cities and in the country lying to the south of Lough Neagh is there any marked concentration on this form of farming. Individual ventures have however proved successful. Thus a jam-factor in Dublin, finding it difficult to acquire adequate supplies, estab-

lished fruit-farms near the city each of which employs several times as many people as the cattle farm that preceded it. Even so, the vast majority of the orchards are decayed, vegetable growing is limited to potatoes or cabbage, and soft fruit is grown in very small quantities.

Lack of capital, or the diversion of capital from agriculture, explains the paucity of these developments to some extent, but it remains clear that the greater part of Ireland is farmed far below its capacity. At the same time wheat gives 20–21 cwts. per acre in Eire in 1941 against 13–17 cwts. in 1850, potatoes 8·5 tons against 3–5 tons, and turnips 16 tons against 11–14 tons; the yield of hay remains around 39–45 cwts. per acre. Agricultural improvements have therefore been so considerable that many more seem credible in the future. Above all the supreme question remains whether rural depopulation is to continue indefinitely or whether some stability will be achieved. Having a natural increase of around 6% in each ten years, and a reproductive rate above parity (unlike Great Britain), Ireland may remain a country of emigration provided that the emigrants can find work elsewhere, but such movement is a potential danger if it militates against the efficiency of agricultural production by leaving too few people on the land.

Note on sources of statistical information

Government Reports: Those containing statistical materials include the 'Census Reports' for Northern Ireland, 1926 and 1937, the Eire 'Census Reports' of 1926 and 1936 (with excellent General Volumes), the Eire 'Register of Population,' 1941, the 'Preliminary Report of the 1946 Census,' Dublin 1946, the annual 'Statistical Abstract' of Eire, and the quarterly 'Irish Trade Journal and Statistical Bulletin,' Dublin. Two valuable reports for Eire are the 'Agricultural Statistics' (*a*) 1847–1926, Dublin 1930, and (*b*) 1927–1933, Dublin 1935: the former contains a classic account of Irish agriculture by John Hooper and the latter has useful distribution maps. Post-war trends are discussed in 'Eire, Reports on Agricultural Policy,' Dublin 1945. For Northern Ireland, see 'Annual Reports upon the Agricultural Statistics,' Belfast, the 'Ulster Year Book,' 1929, 1932, 1935, 1938, the 'Marketing of Northern Ireland Agricultural Produce,' 1932, and Government of Northern Ireland 'Reports of the Agricultural Enquiry Committee,' Belfast, 1947, Cmd. 247.

L. D. Stamp, 'An agricultural atlas of Ireland,' London, 1931, and L. D. Stamp and S. H. Beaver, 'The British Isles,' London, 1933, pp. 152–97 and 240–62 contain distribution maps (1930 statistics) and comment. C. M. Arensberg and S. T. Kimball, 'Family and community in Ireland,' London, 1940, deals with social life among a farming people in Co. Clare and has some comment on the general agricultural organization.

DISCUSSION

Before the paper the CHAIRMAN (Professor L. DUDLEY STAMP) said: Ladies and Gentlemen, to-day is St. Patrick's Day and it is therefore particularly appropriate that we should welcome a visitor from Ireland. Mr. Freeman is Reader in Geography at Trinity College, Dublin, and not only has he done great work in building up the academic study of geography in Ireland but he has also been extremely active, as its President, in fostering the Irish Geographical Society. I am asked by the President and the Council of our Society, and I am sure I may say also by the Fellows here present, to ask Mr. Freeman if he will convey to the

Irish Geographical Society the cordial greetings of the Royal Geographical Society here in London. Mr. Freeman may have something to say about the comparative neglect of the study of the geography of Ireland in that it has hitherto been little represented in papers read to this Society. That omission is to be repaired to-day and so, without more ado, I call on Mr. Freeman.

Mr. Freeman then read the paper printed above, and a discussion followed.

Dr. E. LYNAM: I feel I am expressing the feeling of all who have come on this St. Patrick's Day to hear Mr. Freeman speak about the agriculture of Ireland when I say that he has given us full measure. To one who knows the country as I do, it has been an extraordinarily comprehensive and thorough account of Irish life, agricultural, economic, social, and historical.

As a member of the Irish Geographical Society, which I first suggested fourteen years ago to Dr. Farrington in Dublin as something greatly needed in Ireland and which became active soon afterwards, I hope to see closer relations established between Irish and English geographers, to their mutual benefit. Ireland provides a rich field of interest to all concerned with the various branches of geography. I am sure the Fellows of the Royal Geographical Society hope that the Irish Geographical Society, of which Mr. Freeman is President, will succeed and also that the two societies will come into closer and closer touch.

Professor D. L. LINTON: May I first of all reinforce Dr. Lynam's plea for greater support by British geographers of geographers in Ireland? It is obvious from what Mr. Freeman has said that Ireland is a country very different indeed from the larger island, offering strongly contrasted problems, and particularly is this true of Irish agricultural life. Many of us professional geographers are perhaps apt to dash off during long vacations to rather remote places in search of something different from what we see around us; and all the time there is a rich and unexplored field awaiting us across the Irish Channel and, we gather, with certain gastronomic compensations if we make the journey! It is obvious that Irish geographers must always be proportionately fewer in number than those of the larger island, and unless they can count on some support from their British colleagues it is likely that many Irish geographical problems will remain unsolved for a long time to come. It is clear that those problems are very real. Mr. Freeman has touched only on the salient points and could not this evening come to grips with all the problems he has raised. I should like to touch on one of them.

The striking feature of Irish agriculture, I think you will agree, is the multiplicity of small farms. The first question here is: Why are there so many farms of this extraordinarily fragmented character, with not only small total acreage but made up of very small fields? Mr. Freeman has suggested at least three different reasons that have led in different parts of Ireland to small farms. He mentioned an historical reason which is applicable in some cases, namely, squatting by persons dismissed or evicted from large estates. That recalls similar movements of peasant people in other parts of Europe and calls for investigation and comparison. I am sure it is not the only historical reason which has operated. The old systems of land tenure and the mode of inheritance of the land have also a good deal to do with the fragmentation. In the north-east, Mr. Freeman mentioned that the small size of the farms is connected with the cultivation of flax. Flax cultivation, as he emphasized, involves a great deal of labour and that labour is supplied by members of the farmer's family. Labour supply being thus limited, there is a limit to the amount of flax which can be grown by a single family, just as, in the cotton belt of the United States, the amount of cotton which can be raised on a single farm is limited, I believe, to

about 20 acres. This limit in the acreage of the most profitable crop naturally limits the size of the holding. Then in the west there is a different reason, neither historical nor agronomic, but simply the harsh fact that the patches of cultivable land are not big enough to permit larger farms being laid out. I have seen in the Rosses in Donegal, one of the congested districts in which population has increased, fields as small as a normal-sized tennis court.

If one single characteristic of Irish farms may have so many reasons, it is clearly a large field of investigation to find out how far the various reasons are operative in different parts of the country and to relate these in detail to physical conditions.

Finally, I wish to comment on two of Mr. Freeman's maps. First, his population map on which I should like to congratulate him: it is by far the best map of the distribution of the population of Ireland that I have yet seen. I hope it will become widely known through the pages of this Society's *Journal*. The other map I should like to mention is the one he showed us first, depicting the number of farms in each of three categories of size. Regarding it, I hope Mr. Freeman will accept a word of friendly criticism. Purely cartographically I think it an unsuccessful map. He has tried to show too much in a single diagram and has pursued two different objectives. The first uses symbols of very contrasted sizes to emphasize different sizes of farms. The second, and to my mind the more important fact that the map should show, is the number of farms of each class. Knowing that the small farms are in fact the more numerous class, I feel that they were outweighed on the map by the larger symbols representing the larger farms. I feel Mr. Freeman would make his point better if he presented three maps, one for each of the different categories, so that the three distributions could be disentangled and seen clearly.

Dr. E. LYNAM: Mr. Freeman described a state of affairs in parts of Ireland where a number of very small holdings were hopelessly intermingled. That also once existed in England as a result of the Open Field system, as one may see on any sixteenth-century map showing small parcels owned by one man widely scattered. That problem has been settled in England by Enclosure Acts, public and private, and by voluntary exchanges where each man consolidated his holdings. Such enclosures have been going on for three centuries and are practically complete now. Has the Irish Government done anything to effect consolidation of holdings between neighbours who are, agriculturally, so uncomfortable?

The Lady LECONFIELD: To what extent is sugar-beet grown in Ireland and how many sugar-beet factories are there at present?

Colonel BURCOLD: Is there in future going to be less ploughing in Ireland, particularly in the west, and will there be a return to the rearing of more cattle? Always on the roads of Ireland one never went far without seeing cattle, sheep, and donkey-carts. That is the great difference between England and Ireland. When Cosgrave came over to England at the time of the Peace Treaty he was taken for a drive over the Great West Road and the Great North Road by an Englishman who asked him "What do you think of these English roads?" Cosgrave replied "They are very lonely."

Dr. A. E. MOODIE: I wonder if, from his long acquaintance with the country, Mr. Freeman would briefly give his view of the impact of political affairs in Ireland on the utilization of the land. It is a tremendous problem and, in my opinion, the fundamental problem in Irish agriculture at the present moment. I have visited the country regularly during the last eighteen years and have seen a great change taking place in the actual use of the land. I can remember from previous years considerable areas of grassland which have now been ploughed.

I am informed that it is now the policy of the State to foster a system of economic autarchy but, judging by what I have seen happening in villages and towns, it does not seem to have been very successful. Apart from restrictions imposed on importation during the recent war there does not seem to be as much food as there used to be ten or fifteen years ago. If the Irish experiment has not really succeeded, might not our own Government learn some lessons from it?

Mr. K. H. CONNALL: Might I suggest one or two reasons for the fragmentation of holdings in Ireland in addition to those mentioned by Mr. Freeman and during the course of the discussion? First, dependence on the potato which allowed a family to get its living from a very tiny holding. Secondly, in the early nineteenth century there was an early age of marriage, in contrast to the present position in Ireland, which led to very large families for which there was little opportunity in industry and comparatively little outlet in emigration until the 'thirties of the century. This meant that the land had to be broken up to accommodate an expanding population. Thirdly, during the Napoleonic Wars, with rising wheat prices and with the British corn market thrown open to Irish farmers duty free, there was a swing from pasture farming to arable, and with the extreme shortage of capital amongst the Irish peasants arable cropping had of necessity to be on a tiny farming scale. In addition, in 1793 the franchise was extended to the 40*s.* freeholder, and the landlords' political as well as economic interests were therefore furthered by allowing such division. It seems to me that the cause of these tiny holdings must be found in the Irish scene before the middle of last century, because since then the tendency has been towards larger holdings.

The CHAIRMAN: I will ask Mr. Freeman to reply to the points raised, but first there are one or two points I have myself noted down.

Like Professor Linton, I was particularly intrigued by the population map. It was in my mind to ask Mr. Freeman how it was constructed; how he eliminated the uninhabited lands, what acreage he took of the remainder, and how he actually calculated the population densities. It is something which I believe some of us have attempted for Scotland and found to be full of extraordinary difficulties. I cannot agree with Professor Linton in regard to the map of farms. It struck me as being most ingenious and conveyed to my mind the whole picture in a rather remarkable way.

One intriguing point which occurred to me was that the actual number of farms with which Mr. Freeman is dealing in Ireland is almost exactly the same as the number of farms in England and Wales. In view of the disparity in area between the two countries, this gives one some idea of the relative size of the average Irish farm.

Mr. T. W. FREEMAN: I must thank all the speakers for the extraordinarily kind reception that they have given to my paper. Development of the relationship between Irish and British geographers will give us very great pleasure in the University of Dublin and in the Irish Geographical Society. In 1946 we welcomed at our annual field week one London geographer and hope that there will be many more. The various questions all seem to demand a lecture in themselves by way of answer, but I must give short answers which will not be prefaced by the words "It all depends what you mean by," though there would be some justification for it.

In reply to Dr. Lynam, I would like to say that the consolidation of farms under Irish conditions is apt to lead to very great difficulties, though a few small pieces have been done. We found one patch in Co. Kilkenny in which five farmers had some 200 acres of land so divided that hardly ever could a farmer approach his fields without going through the fields of at least two other farmers.

The social workers who visited the farm houses found out exactly what the occupants of each thought of the others: having had that experience one realized the extraordinary difficulty of making this kind of land exchange. One could visualize five reasonable farms but the human difficulties come in all the time and nearly all such schemes have proved too difficult to carry into effect so far.

The problem as to the reason for the number of small farms was raised by two speakers, Professor Linton and Mr. Connall. In reply, I would like to make two simple points. First, there are, I am sure, many reasons which will operate, one here, another there, and many are deeply rooted in past history. Farms are, of course, still being divided. In Ireland, there is no primogeniture and a farm may be given to any member of a family or to two members of one family even to-day. That leads to a second point. We need an historical geographer who will try to reconstruct the regional geography of Ireland about the year 1845. There is a body of researchers working in Ireland on the famine years and their work will eventually be helpful. We need a study of Ireland at that particular period, the time when the Ordnance Survey had just completed its survey of the country.

I thank Professor Linton and Professor Dudley Stamp for their interesting remarks on the maps. There are many ways of expressing the distribution of farms. One is a map of average size, area by area. But I should like the two protagonists to decide whether it is a good map or not.

A question was asked about political aspects of Irish agriculture: not on any account would I answer the question in any fullness. But the problems of agriculture in Eire are numerous at the present time and much of the difficulty lies in the scarcity of fertilizers combined with compulsory tillage. Every farmer has to till a certain amount of land and in some parts of the country that meets with considerable resistance. The autarchy idea became popular after 1932, since when tillage has been favoured, but there are signs that autarchy is not now as popular as it once was.

There are four sugar-beet factories in Ireland, in Carlow, Mallow, Tuam, and Thurles, and the country is almost self-sufficient. On the other hand, the farmers complain that sugar-beet is a very difficult crop to grow, especially under Irish conditions. The crop needs a great deal of attention, often more than their labour force can conveniently provide.

I think one of the difficulties that is going to arise in Irish farming is the shortage of labour, especially the shortage of casual labour. For the first time in Ireland there are complaints about the difficulty of getting ordinary farm labour. Speaking broadly, emigration has been to a considerable extent desirable and even necessary, but it has possibly gone too far; too many people are leaving the land at the present time. There are attempts to restrict emigration but even so it continues to be considerable.

We are only at the beginning in Irish geographical research. At least perhaps I have managed to suggest that we can provide research subjects to all who come along. I know that applies also in England but the work in Ireland, different from that in many other countries, should be attractive to those seeking "fresh woods and pastures new."

The CHAIRMAN: It only remains for me to convey formally the thanks of the Royal Geographical Society to Mr. Freeman for his excellent paper.

TIBET AS A GRAZING LAND

F. KINGDON-WARD

THERE IS AN aspect of Tibet, and in the modern world perhaps the most important one, which is rarely emphasized. The people with their strange culture and stranger religion, the topographical features, violent and primitive like those of newly upheaved crust, the fierce climate, the vegetation—where there is any—have all been the theme of travel books or have received attention in geographical literature. But Tibet considered primarily as a grazing land seems to have been overlooked. Yet that is what it really is.

My object here is to make a contribution to the geography of Tibet from this aspect, partly as a result of my own observations, and at the same time to indicate briefly how incomplete and indeed one-sided our knowledge of the country is. I hope also to suggest the lines along which, in my opinion, research might profitably be carried on for the benefit both of the inhabitants and of the world generally.

Tibet has no clearly defined political frontiers recognized by the Tibetans themselves and by their neighbours; still less has it clearly defined geographical boundaries. Hence the name Tibet is in a sense a geographical expression, an abstraction; it is a regional rather than a political name. Here the term Tibet is used in its most comprehensive sense, unrestricted by political prejudices, having regard only to what constitutes the Tibetan plateau lands.

By far the greater part of the country is divided between desert and grazing land. Forest and arable land form a very small proportion of the non-desert area. Before describing the pasture land in detail, it will be helpful to give a brief sketch of the topography of Tibet as a whole and its probable evolution.

Fundamentally, Tibet comprises a huge plateau which, having been subjected for many millions of years to climatic wear and tear, has lost some of its simple outlines and in parts has taken on an unplateau-like appearance. In short, raw as it appears at first sight and far from mature as it undoubtedly is, Tibet has lost its first youth.

From the beginning the plateau was no doubt crossed by ranges of mountains, as it still is, rising several thousand feet above the general level. These ranges are separated from one another by trough-like valleys of varying but always considerable width. In fact, the troughs constitute the most obvious part of the plateau on which the elevated portions appear as mere excrescences. Scores of lakes, large and small, break the smooth monotony of these plateau troughs. In the west the ranges appear to originate in the knot or node of the Pamir plateau and, after diverging slightly, to keep roughly parallel for 1000 miles before making their exit in the east. Here and there however a range bifurcates, so that more ranges appear to leave the plateau in the east than enter it in the west.

The whole of northern, western, and central Tibet, and of southern Tibet

west of Lhasa is plateau-like to the eye. Even a traveller crossing the country from north to south would confirm this, for he would more often be crossing wide stony plains than climbing mountains. Still more would he confirm it were he to travel eastwards along one of the wide troughs between the ranges, for the mountains would be far away most of the time.

What is more difficult to realize is that south-eastern Tibet is part of the same plateau; for there is probably no part of the world which looks less like a plateau, consisting as it does of a network of high, narrow mountain ranges separated by profound gorges. No one looking westwards from Yachow, eastwards from Sadiya, northwards from Fort Hertz, or southwards from Taochow would be likely to think of the view before him in terms of a plateau. Yet the gigantic and intricate mountain ranges of south-eastern Tibet have actually been worn from the outer rim of the plateau and must be regarded as part of it. They are not, as one might think, due to special uplift apart from the rest of the plateau and at a different geological period. On the contrary, they appear to be of the same age and to owe their elevation to the same forces acting throughout the same period. Although the geological structure of the region is unknown—and the geologists will no doubt claim the last word—a geographer's view of it and of the superficial forces now at work can lead to no other conclusion. This view is further supported by botanical and zoological evidence, though this is far from complete.

In order to understand the evolution of Tibetan scenery, it is essential to examine the whole region here called Tibet, from the plains of India and China, across the Himalayas and the snow mountains of Yünnan and Szechwan, to the heart of dry Tibet, and to note the forces at work on it now and in the past. The geographer then will recognize six natural sub-regions, four of which show clearly enough their origin from a typical plateau. The other two are not perhaps sub-regions at all, but local variations or sub-sub-regions. However, it is convenient at present to regard them as equivalent with the four major sub-regions. The six sub-regions are as follows: (1) the interior plateau (Tibet of the nineteenth-century travel books); (2) the outer plateau (Tibet of the Younghusband Mission to Lhasa); (3) the rainy gorge sub-region (the Tsangpo gorge); (4) the arid gorge sub-region (Tibet of Huc and Gabet); (5) Tsaidam (Central Asian Tibet); (6) Chinese Tibet (western Szechwan and Kansu, north-western Yünnan).

The interior plateau or Tibet lake basin (Tibetan: chang tang)

This is the last remnant of the original plateau after long continued weathering and attendant forces have worn away the rim on three sides. The lake basin consists mainly of flat, gravel-covered surfaces with lacustrine beds derived from dried-up lakes. There are also wind-borne accumulations and others perhaps settled from sheet glaciers. Wide stony plains stretch east and west between comparatively low rocky ranges. Although heavy rain falls for short periods during the summer,[1] the rainfall appears to be dwindling. There are very many salt or brackish lakes, their longer axes lying east–west, parallel with the trough valleys. The mountain ranges do not rise much above the general level of the plateau (16,000 feet) and have sierra-like crests. Glaciers

[1] Sven Hedin, 'Central Asia and Tibet,' vol. 2, pp. 318–9, 325–6. London, 1903.

are few and small and of the hanging type. Weathering is in excess of transport, which is confined to wind and to rivers which are in spate for short periods only and dry for most of the year. All drainage is internal.

Owing to drought and to the severe climate, the interior plateau is a near-desert. Temperatures, even in summer, rise only a degree or two above freezing, but the daily and seasonal temperature range is much less than it is in many parts of the world. Temperature gradients also are low. Vegetation is extremely scanty; the fifty or sixty species of flowering plants known are widely scattered and all are dwarf or stunted forms. Only two or three species are endemic. A very few woody plants send up annual shoots from stout perennial root-stocks. Grazing appears to be of the scantiest. Nevertheless large herds of antelope are reported by Deasy [1] in the north-west. Their visits may possibly be seasonal.

For the present at least the interior plateau may be dismissed as comparatively useless to man, except perhaps as a landing ground for aircraft and on some of its lakes for flying-boats. Certain arctic plants, *e.g.* "reindeer moss," might perhaps be introduced in some parts. Conversely, it is possible that a few plants which grow here, *e.g.* Ephedra, might profitably be grown in similar regions elsewhere.

There is every reason to believe that the whole of the outer plateau and river gorge region was originally part of a single plateau or lake basin, though possibly there were two or more disconnected lake basins. To-day we can follow the gradual transition from interior plateau to outer plateau and from outer plateau to gorge country without much difficulty.

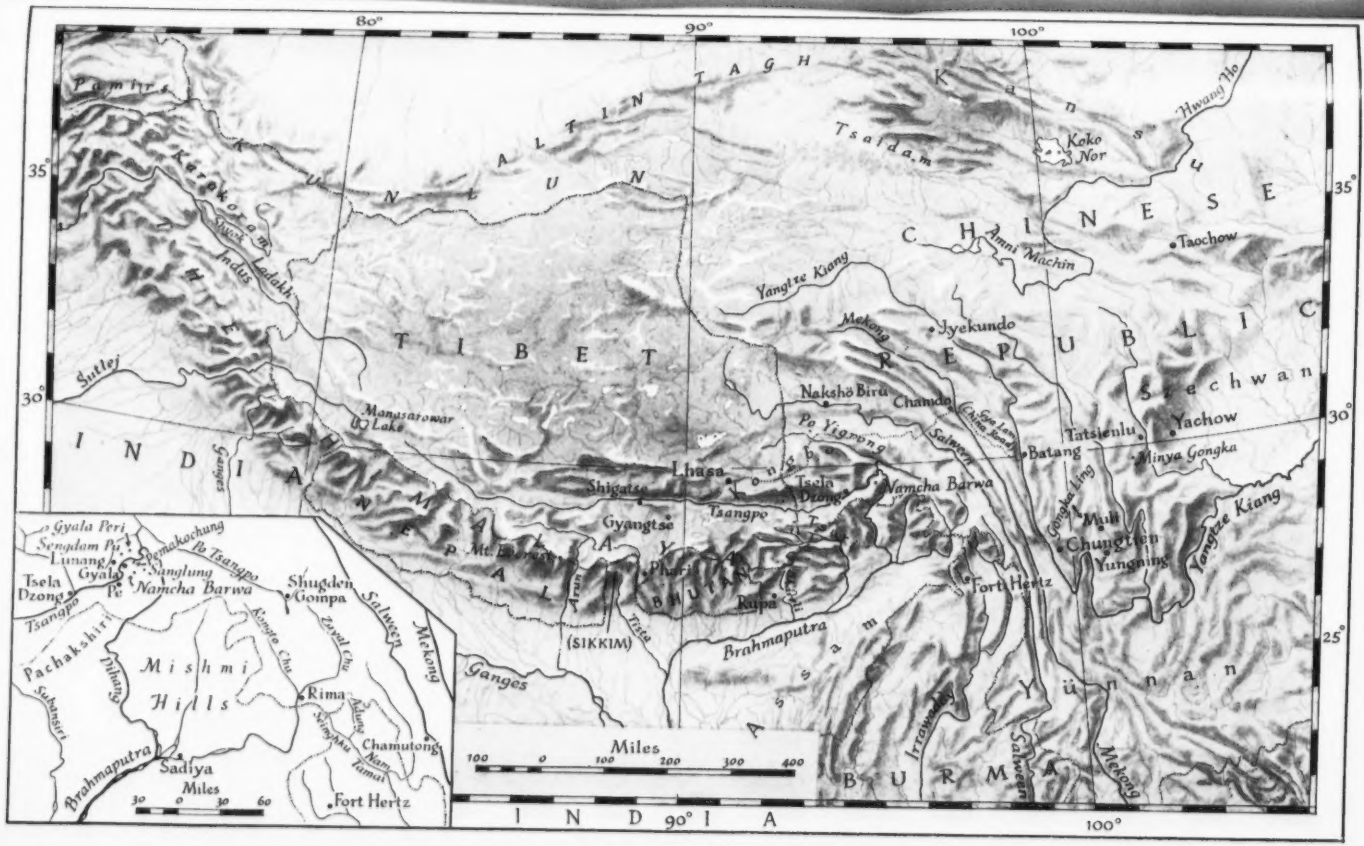
The outer plateau

Streams, rising on the outer slope of the lake basin, flow away from it and eventually reach the sea. At their heads they sap back into the rim of the basin, gradually capturing its rivers and draining its lakes. Owing to the uniform general altitude, there is no sharp distinction between the two regions and no appreciable watershed. In the south-east quadrant at least, the watershed is marked by marshy plains spread over enormous areas at the ultimate sources of the Hwang Ho, Yangtze, Mekong, and Salween rivers. The western margin of the lake basin is perhaps more easily defined, since the great mountain ranges of the western gorge country come much closer to the sources of the rivers than they do in the east. The dry climate seems to be an important factor here.

It is a point of some interest that the tributary rivers of the gorge region are cutting back into the outer plateau more rapidly than the main rivers can cut back into the lake basin. If this unequal erosion were to continue, the outer plateau would eventually disappear and the gorges abruptly succeed the lake basin, possibly with the formation of much greater waterfalls than exist at present. But other factors are likely to intervene before the process is complete. At present a considerable area of the outer plateau is indistinguishable from the interior lake basin, except by the presence of freshwater instead of salt lakes and perhaps a slight mitigation of climate.

In the south-east quadrant, the outer plateau slopes more rapidly towards

[1] H. H. P. Deasy, 'In Tibet and Chinese Turkistan,' p. 26. London, 1901.


80°
90°
100°
35°
30°
25°
Pamirs
Karakoram Mts.
Indus
Shyok
Ladakh
KUNLUN MTS.
TAGHKULUN MTS.
Tsaidam
Koko Nor
Hwang Ho
CHINESE
Amni Machin
Taochow
Yangtze Kiang
Mekong
Jyekundo
REPUBLIC
Szechwan
TIBET
Sutlej
Manasarowar Lake
Nakshō Biru
Chamdo
Salween
Pe Yigrong
Batang
Tatsienlu
Yachow
Minye Gongka
INDIA
Ganges
Lhasa
Shigatse
Tsangpo
Iscla Dzong
Namcha Barwa
Gyangtse
Mt. Everest
HIMALAYAS
Phari
Tista
Rupa
(SIKKIM)
Brahmaputra
Assam
Gongka Ling
Muli
Chungtien
Yungning
Fort Hertz
Yangtze Kiang
Yünnan
Irrawaddy
Salween
Mekong
BURMA
Gyala Peri
Sengdam Pk.
Lumang
Gyala
Tsela Dzong
Pe
Tsangpo
Pemakochung
Pe Tsangpo
Sunglung
Namcha Barwa
Shugden Gompa
Pachakshiri
Mishmi Hills
Rima
Sadiya
Miles
30 0 30 60
Fort Hertz
Chamutong
Miles
100 0 100 200 300 400

habitable levels, due no doubt to the larger number of rivers. In the north-west the transition is abrupt; some parts of the outer plateau close to the rim of the lake basin are habitable, in spite of the fact that there is no cultivation; for example, in the neighbourhood of Manasarowar and in parts of Ladakh.

The outer plateau is the most valuable part of Tibet, as well as the part familiar to European travellers and the only part most of them ever see. Naturally therefore the gravel plains, such as those which stretch from Phari to Gyangtse, with their lovely blue, freshwater lakes have come to represent Tibet as a whole. Nor is this unreasonable since, of the four major sub-regions into which we have divided the country, the outer plateau is the largest. But as always the geographer must here be on his guard against a partial or over-simplified picture.

The outer plateau comprises the great plains, at an average elevation of 13,000–15,000 feet, with their mountain ranges, often snow-clad, rising as much as 6000 feet above the general level, and broad valleys between. The lakes of the outer plateau are neither so numerous nor on the whole so large as those of the interior plateau, though they include Koko Nor, the largest of all Tibetan lakes. All are freshwater, and they too show evidence of contraction in the form of raised beaches, *e.g.* those of Manasarowar lake. The climate, though severe, is less harsh than that of the interior plateau, with heavier rainfall, especially in the east. At the lower levels the summers are almost genial and several crops are cultivated, of which the chief is barley. At Shugden Gompa barley ripens at over 13,000 feet.

The headwaters of seven large rivers—Indus, Sutlej, Brahmaputra, Salween, Mekong, Yangtze, and Hwang Ho—rise on the outer plateau. Some of the Himalayan rivers, such as the Arun and Tista, as also the main stream of the Irrawaddy, have cut their way back a short distance through the plateau rim. The outer plateau is well watered, although in winter much of it is frozen. Even the Salween, according to Ronald Kaulback,[1] is solidly frozen over at least as far east as Nakshö Biru, probably as far as 95° 30′ E.

The vegetation, which is almost entirely of the alpine type, is scanty at the higher levels like that of the lake basin, but becomes more varied and abundant as habitable levels are approached, especially in the south-east. Here scrub appears, mixed with alpine pasture. In the villages where irrigation is essential there are even a few trees—elm, willow, and poplar. The beginning of true forest, always coniferous, marks the boundary between the outer plateau and the gorge country. Just as the lake basin passes gradually into the outer plateau in the east—though without a change of climate or vegetation—so the outer plateau passes gradually into the gorge country.

All the principal Tibetan towns—Lhasa, Gyangtse, Shigatse, Chamdo, Jyekundo—are situated on the outer plateau, where cultivation begins, though it is still predominantly a grazing country. Most of the settled population is located here.

The outer plateau is divisible into two contrasted parts: rolling grassland in the east on the borders of the gorge region where the rainfall is ample, and gravel plains in the south and south-west bordering the Himalayas where rainfall is deficient.

[1] Ronald Kaulback, 'Salween,' p. 168. London, 1938.

The river gorge region

The great gorges of Tibet have a double origin; as some of them clearly show, they were cut first by glaciers and later by rivers. As pointed out by the late Professor Gregory,[1] the Mekong is a valley within a valley; and in the valleys of the Tsangpo and of the Nam Tamai, one of the sources of the Irrawaddy, I have observed two levels—an upper glacier level where the valley floor stood in glacial times, and a much lower water level where the floor stands to-day. This is almost certainly true of all the Tibetan rivers, at least in the south-east quadrant. Some of these rivers are double also lengthwise. That is to say, they have been formed by the linking up of a river flowing down the outer slope of the boundary ranges with an interior river captured by rapid head erosion. This process still goes on. Thus the Tsangpo gorge was formed by the Dihang in Assam cutting its way back into the ice-worn Tsangpo valley and capturing its river. The same is true of the Subansiri and probably also of the Salween, the Mekong, and other eastern rivers.

Following the Tsangpo down from the outer plateau to the gorge, one notices an abrupt change of vegetation in the neighbourhood of Gyala, due to the sudden change of climate from dry to moist. I have observed the same swift change on the upper Subansiri and on the Salween, where it is remarkably abrupt, in lat. 28° N.

Gorges imply that the river has cut its way through a mountain range or high plateau. It rarely if ever happens that a river flows in a deep gorge parallel to a mountain axis for any distance. In the Assam Himalaya several rivers flow in trough-like valleys more or less parallel to the outer ranges before breaking through them to reach the plains; the Bhareli and its tributaries are a good example of this. But the distances are small and the gorges are no more than steep-sided valleys, or they are associated with a particular rock, as at Rupa, for instance, where limestone outcrops. When therefore one sees the 200-mile-long gorges on the Mekong and Salween, situated where those rivers are, like the Tsangpo, leaving the plateau and turning south, one inevitably suspects that they are *crossing* the axis of a mountain range. That the Himalayan axis is prolonged north-eastwards from the hairpin bend of the Tsangpo across south-eastern Tibet and so into China is disputed by geologists on the ground that the mountains of Szechwan and Yünnan, if not of south-eastern Tibet, are much older than those of the Himalayan uplifts. But the geographer, viewing the arrangement of the mountains and seeing the deep river gorges like huge slit trenches, is not easily convinced by theoretical considerations. Not only the geographer but also the botanist and the zoologist who have studied the distribution of life in this part of the world can, I believe, come to no other conclusion than that these rivers are cutting across the axis of a great mountain range, whatever its age. Alone amongst modern geologists, the late Professor Gregory [2] took this view though perhaps with reservations. The fact that superficially the ranges here appear

[1] J. W. and C. J. Gregory, *Geogr. J.* 61 (1923) 167–8, and 'To the Alps of Chinese Tibet,' pp. 69–70, 308–10, London, 1923.

[2] J. W. and C. J. Gregory, "The Alps of Chinese Tibet and their geographical relations," *Geogr. J.* 61 (1923) 153–79, and 'To the Alps of Chinese Tibet,' pp. 304–14.

to trend north–south instead of east–west has no bearing on the problem: parallel rivers crossing a plateau or mountain range must necessarily carve parallel ridges between them.

I have treated the river gorge sub-region as though it were two, a wet and a dry. Nevertheless both have the same origin and such differences as they show are entirely due to climate, which in turn is the result of local or regional topography. As however these climatic differences bring about differences fundamental to man who occupies the gorges, the geographer is perhaps justified in treating them separately.

The arid gorge region.—North-west of Manasarowar lake is a narrow belt of country between the Great Himalayan range and the Karakoram where the Indus, Shyok, Sutlej, and their tributaries flow in deep gorges comparable with those of the eastern rivers. There is this difference however; the country is very dry, like the interior lake basin, hence there is no forest. Cultivation in these dry gorges is confined to alluvial fans which can be easily irrigated, and here too are the only trees, chiefly willow, walnut, and poplar. The country is barren, rocky or stony, and sparsely populated. On the Karakoram range are many glaciers and small lakes.

In the east, the gorges of the Salween, Mekong, and Yangtze are also rather arid. Large alluvial fans, well terraced for cultivation and skilfully irrigated, support a considerable population. Many of the fans are situated at some height above the river ("hanging fans"). Trees, notably walnut and pear, give a park-like appearance, particularly beautiful in spring when the fruit trees are in blossom. Farther south however, the Salween and Mekong rivers flow through rainy gorges. The arid gorge region in eastern Tibet is less well known than is the corresponding region in western Tibet.

In southern Tibet the upper Subansiri region is arid. So abrupt is the change from dry to wet here that, looking down the valley, one can stand beneath a blue sky and see the cloud bank where the rainy gorge and the forested slopes begin, 2 or 3 miles distant. It is as though a solid barrier were holding back the rain; the barrier being in fact the dry (and possibly high pressure) atmosphere behind the Himalayan rain screen. On the Subansiri however, as on the Tsangpo, the transition is from dry plateau to rainy gorge; there is almost no dry gorge region.

The sudden change from cloud to sunshine, from wet conifer forest to dry thorn scrub, is of course familiar on passes over great mountain ranges such as the Himalaya which lie across the direction of the prevailing wind; here the obstacle to the rain is visible to the eye and immediately recognizable. It is less common in river valleys, and one seeks in vain for a material obstacle to account for so sudden a change. Again it seems to me that the obstacle must be the latitudinal range through which the river has cut its exit, and whose axis lies athwart the direction of the prevailing wind, though it is no longer easily recognizable.

The rainy gorge region.—Proceeding outwards from the Tibet lake basin via the outer plateau, we pass from the arid gorges to the rainy gorges or, as sometimes happens, direct from the outer plateau to the rainy gorges. As already pointed out, arid and rainy gorges may occur on the same river, the change taking place within a few miles. It is in the area between the "wet"

and "dry" gorge that we find the high peaks of the dissected transverse range. A sharp separation between wet and dry gorge occurs, so far as I know, only on the Salween; but an equally sharp separation between wet gorge and dry plateau occurs on the Tsangpo.

The rivers which, in preglacial times, flowed down the outer ramparts of the plateau in a region of heavy monsoon rainfall were strong enough to cut their way back by head erosion into the rim and capture the plateau rivers. This was especially true of the rivers of eastern India during and after the Pleistocene glaciation. The Tsangpo gorge, for example, is a quite recent ice- and water-worn valley. There are tremendous moraines on both banks of the river between Gyala and Pe, two villages near the entrance to the gorge, where the river flows beneath the snow peaks of Namcha Barwa and Sanglung to the south, and Sengdam Pu and Gyala Peri to the north, and the river has cut the high banks of moraine material into terraces. Conditions here were no doubt ideal for the formation of deep narrow gorges. But all the south-eastern rivers and their main tributaries up which the summer monsoon penetrates from the plains leave the plateau by gorges. For this reason the gorges are lined with forest as far as the rain can reach. The monsoon blows more strongly up the Tsangpo gorge from the head of the Assam valley than it does up the Mekong or Salween which are farther inland. But so steep is the gradient that by the time the rain is spent in the Tsangpo gorge we are already on the plateau, and the river above Pe flows in a comparatively wide, shallow, ice-worn trough. In contrast, by the time the summer monsoon has been wrung dry in passing up the Salween valley, only a degree or two farther south, it is still some distance from the plateau and the deepest, narrowest part of the Salween gorge is arid. The gorges of the Mekong begin in about the same latitude (28° 30′) and are still more arid; in fact rainfall decreases progressively in this belt of country as we travel northwards or north-westwards. Still farther north the Hwang Ho flows through partly wooded, partly arid, gorges as it flexes in wide bends from the outer plateau to the plains in the region of Amni Machin.

In the gorges of the Salween, Mekong, Yangtze, and Hwang Ho, owing to their great distance from the sea and from the plains, forest is confined to the higher slopes, at least in the arid gorges, and hence is mainly conifer. The Tsangpo gorge is filled with mixed forest, deciduous and conifer.

The gorge region bears no obvious resemblance to a plateau. Yet we can follow the gradual evolution of the Tibetan river gorges stage by stage from the plateau, and, as Gregory [1] clearly showed, the province of Yünnan is nothing more than a dissected plateau. The north Burma ranges beyond Fort Hertz also have been carved out of a plateau, as their profiles reveal. These three plateaus, the Yünnan plateau, the Irrawaddy plateau, and the much greater Tibet plateau, may all originally have been one; but their relationship has not yet been worked out. It would seem however that the Yünnan plateau is much older than the other two—it is at any rate composed of older rocks; nevertheless it was similarly affected by the Pleistocene glaciation.

The river gorge region is on the whole a region of moderate to heavy summer rainfall, except in arid south-western Tibet, the gorges themselves often being the only comparatively dry areas. Where the summer rainfall is not

[1] J. W. and C. J. Gregory, *Geogr. J., op. cit.*

Phot. supplied by Paul Popper

Arid Mekong gorge

Rainy Tsangpo gorge heavily forested, below Pema-kochung

Phot. U.S. Army Air Force

Tibetan outer plateau from main Himalayan range, with Namcha Barwa on right. Central trough is valley of Tsangpo

Arid outer plateau and north slope of Great Himalayan range

Primula strumosa and P. Gambleiana growing on cattle path at 12,000 feet

particularly heavy, as in north-western Yünnan, there is usually a fairly heavy winter snowfall. Thus it is a true forest climate. The south-eastern gorge region is in fact well forested with broad-leafed, coniferous, or mixed trees according to altitude and local conditions. The tree line stands around 12,000 feet; above, forest passes into scrub and thence into alpine meadow, turf, or scree. The climax vegetation units, arranged in altitudinal belts, are of the same general type as those met with on the southern slopes of the Himalaya and in the mountains of Szechwan and Yünnan, except at the bottoms of the gorges where a distinct vegetation type may occur. The flora as a whole may be described as Sino-Himalayan, a name implying a botanical region equal with the Indo-Malaysian, Eastern Asiatic, Central Asian, and Mediterranean regions which surround Tibet and elements of whose floras enter into that of Tibet.

The population of the whole gorge country is sparse, more or less confined to the upper and lower ends of the gorges and to alluvial fans in the dry gorges, for example on the Salween, where at Chamutong (lat. 28°) wet rice is cultivated on permanent terraces. Chamutong however is at the lower end of the arid gorge, not within it. Considerable stretches of the gorges, both wet and dry, are entirely uninhabited; for example, the Tsangpo between Gyala and the Po–Tsangpo confluence except for the tiny monastery of Pemakochung where one or two people reside.

Some of the peaks, like Namcha Barwa and peaks on the Po Yigrong range north of Tsela Dzong, are over 25,000 feet high and many are over 20,000 feet. The difference between river level and the peaks within a 5-mile radius may be as much as 15,000 feet, and the contrast between the chains of snow peaks and the gorges filled with evergreen forest which they overlook is grand beyond belief. The gorge region indeed includes the most spectacular scenery in Tibet.

There are few lakes and those mainly of the small rock basin type, of glacial origin; all are fresh water, often of the most vivid blues and greens. Glaciers are numerous, the permanent snow-line standing to-day at about 17,000 feet. The glaciers of eastern Tibet are on the whole considerably smaller than those of western Tibet, in spite of the heavy snowfall in the east. The reason for this may be the generally lower mountain ranges and 5° lower latitude; also, and perhaps more significant, eastern Tibet is nearly 500 miles nearer to the sea.

The important point in the evolution of Tibetan scenery is the gradual transition from lake basin to outer plateau and from outer plateau to gorge region. The upper reaches of the Tsangpo, Salween, and Mekong were perhaps occupied by trough glaciers and by lakes. The late Sir Sidney Burrard [1] suggested that the Tsangpo originally flowed in the opposite direction—from east to west—and there is some evidence in favour of this view. If it did, it probably had its sources amongst the glaciers of Namcha Barwa and Sengdam Pu, near Gyala, where there are immense moraines. Below this point the gradient of the river bed increases very rapidly. Burrard's view requires confirmation. Yet, looking westwards up the valley from Tsela Dzong, one might

[1] S. G. Burrard and H. H. Hayden, 'A sketch of the geography and geology of the Himalaya mountains and Tibet,' part 3, pp. 155–6. Calcutta, 1907.

easily believe that the river is flowing away from one to the west. It is a curious illusion, caused partly by the decreasing height of the terraces in that direction, partly by the spurs not interlocking, partly no doubt by the diminishing height of the mountains.

But whether or not the Tsangpo once flowed west, it seems that during the Pleistocene glaciation its valley was occupied by a glacier which had not then broken across the Himalayan axis[1] and that the Dihang, also fed by glaciers, and by tremendous monsoon rains, was rapidly sapping back at its source. Eventually the Dihang cut a passage through the Gyala Peri–Namcha Barwa axis and tapped the plateau trough valley, whose waters poured through the gorge.

Tsaidam

In the north-east corner of the Tibetan plateau is a considerable depression, its average altitude little more than half that of the lake basin. This is Tsaidam. Some geographers include it in the Mongolian plateau region, perhaps because it is inhabited chiefly by Mongols. It seems to fit better in the Tibetan plateau. The average elevation is 8000–10,000 feet so that it lies some 6000 feet below the average level of the Tibet plateau; but it is also some 6000 feet above the average level of the Mongolian plateau, and since it is situated south of the Altin Tagh range (which is probably an eastward extension of the Kunlun) it is, I think, more correctly regarded as a depressed corner of the Tibetan plateau.

Not much is known about the topography of this remote region. It may originally have been an immense lake. To-day Tsaidam is partly a grassland region with fair grazing, partly a swamp; it includes a few small salt lakes. It is cut off from the outer plateau to the east and south by ranges of mountains which have not been cut through by rivers.

Chinese Tibet

The very mountainous region of western Szechwan, north-western Yünnan, and southern Kansu has been loosely called Chinese Tibet. The name is not a good one and I hesitate to use it; yet it is difficult to find a better. Neither Chinese nor Tibetans have a name for what the western geographer comprehends as a definite sub-region with underlying unity. Much of it is still unexplored in detail.

Though geologically older than the Tibet plateau proper, there can be no question of its total relationship with that region throughout the most dynamic period of geological history. And it is the Tibetan rivers resulting from the Pleistocene glaciation which have given it its present form. Chinese Tibet has in fact much in common with the river gorge region and cannot be sharply separated from it; but here *all* the principal rivers flow southwards, including the Yangtze and its eastern tributaries, the Litang and Yalung. Near the edge of Chinese Tibet the Yangtze turns north-eastwards, just as the Tsangpo–Brahmaputra eventually turns south-westwards. The latter flows along the base of the mountain range through which it has cut, and so perhaps does the Yangtze.

[1] It is possible that a glacier flowed from the Tsangpo valley over the Doshong La, a low pass immediately south-west of Namcha Barwa.

Chinese Tibet, like the gorge region in general in which it might well be included, is a region of great meridional ranges separating deep, gorge-like valleys. Many of the ranges are composed of limestone, giving a characteristic skyline. None of the gorges are so richly forested as those of the rainy gorge region farther south, nor so arid as those of the Salween and Mekong in the arid gorge region. They appear to have the same double structure, to have been scooped out first by ice, later by water. The visible alignment of the mountain ranges is north–south in Yünnan, and generally in Szechwan also; in Kansu however it is east–west. This is significant since there was less glaciation here. There are a few small lakes, as at Yungning and Chungtien, the latter more a swamp to-day but formerly a large lake which has been gradually silted up, and numbers of small glacier tarns in the mountains, for example those above Muli. On the whole, the climate of Chinese Tibet is less continental than that of the plateau. Rainfall and snowfall are more moderate, with perhaps greater humidity and certainly a smaller temperature range than on the outer plateau, although there is wide variation between mountains and valleys.

Chinese Tibet includes small grassland plateaus, *e.g.* the Chungtien plateau in north-west Yünnan, rolling moorland covered with a heather-like growth of dwarf Rhododendron, such as are frequently seen in south-western Szechwan and other parts, and many snow massifs, of which a few have names known to western geographers, *e.g.* Gongka Ling and Minya Gongka, both in western Szechwan. The diversity of scenery is probably greater than in any other part of the plateau, and there is a remarkable wealth of plant life.

It is on the whole a more fertile and more thickly populated region than any of those previously described; but the inhabitants live in isolated pockets and, owing to poor communications and to easily defensible positions, are far from uniform in language, although curiously, considering their probably diverse origin, other aspects of their culture appear to be fairly uniform, whether basically "Chinese" or, more commonly, basically "Tibetan." Towns, which are in reality no more than large villages, are confined to the outer edges of Chinese Tibet near to the plains, and to the several main caravan routes which pass through the region. These towns, which are primarily trading posts, control traffic between the plains and the mountains, and may be predominantly Chinese like Tatsienlu or predominantly Tibetan like Yungning. Essentially they are centres of trade where the two races come into close contact.

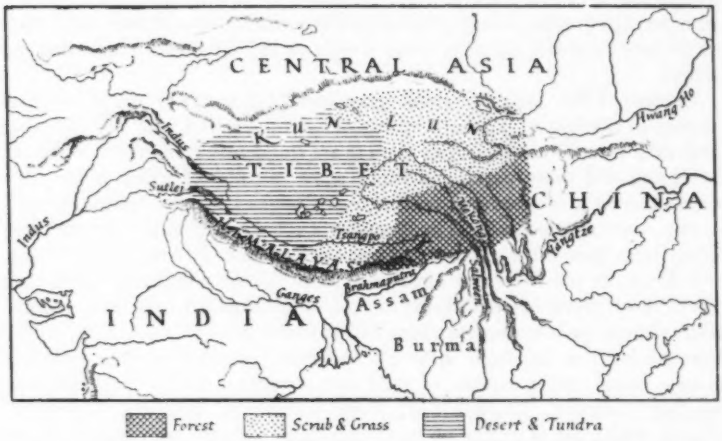
The grazing lands

Tibet cannot within foreseeable time be anything other than a pastoral country. Even in the rather unlikely event of rich mineral wealth being discovered, any activity which might result would be purely local for a long time. There is, at any rate at present, no prospect of industrialization. On the other hand, the development of flying is bound to have a considerable influence on the future of a region which has remained unchanged for centuries mainly because of its inaccessibility. There is the more reason to study its possibilities as a grazing country in the hope of improving the herds and the grazing, developing communications with the manufacturing world, and

encouraging small local industries to progress slowly. Before any of these things can be done however, we need to know a good deal more of the facts.

Most travellers have commented on the contrast between the scanty herbage on the high plateau and the great herds of grazing animals met with, both wild and domestic. Thus Colonel R. Meinertzhagen [1] writes of Ladakh: "The problem of food for these wild asses is a puzzle. Spying a small herd feeding on a hillside, I marked out an area with my glasses and visited the spot. After much search I found a few blades of grass and an alpine plant or two. . . . Their means of subsistence is still a puzzle to me." I have myself been puzzled how the herds of domestic yak, sheep, and goats in the neighbourhood of Shugden Gompa find enough to eat, though the alpine vegetation there is rich compared with that of Ladakh.

Wild herbivorous animals are found all over Tibet, except perhaps in the



arid gorge region. They are especially numerous on the plateau, where the following occur: sheep (*Ovis Hodgsoni*), yak, wild ass or *kyang*, Tibetan antelope (Pantholops), gazelle (Pioöapra), snow leopard, and of smaller animals, hares (*Lepidus hispidus*) and marmots. Pigmy hares (Ochotona) occur in immense numbers on the grasslands. In the wet gorge region and in Chinese Tibet are found takin (Budorcas), musk deer, monkeys, giant panda, and bear. Most of the above are hunted by the tribes.

Domestic animals are kept in Tibet for the purpose of providing some of the main staples of life—wool and hair for weaving, leather and skins for clothing, and milk, butter, and cheese. Butter is used for ceremonial illumination and as a cosmetic in addition to its all important rôle as food. Yak dung is the only available fuel over a large part of the plateau. Meat is a quite secondary consideration; the Tibetans, being strict Buddhists, strongly disapprove of taking life. Since however they like meat, the sin attached to the taking of life is passed on by decreeing that butchers are outcasts.

[1] R. Meinertzhagen, *Geogr. J.* 70 (1927) 131.

The second most important use of domestic animals in Tibet is for transport purposes. Except for goats, all the common domestic animals, yak, *dzo* (a cross between the yak and Indian cattle), sheep, ponies, mules, and donkeys, are used for this purpose. It is at first sight curious that animals seem never to be used for ordinary domestic work like grinding barley, threshing, or turning wheels. But obviously culture has progressed beyond the use of animal power for such purposes: mechanical power, in the form of falling water, has long been known. Cattle however are used for ploughing. On the outer ramparts of Tibet, in the forested regions beyond reach of the church, cattle are kept by the "lopa" (*i.e.* wild tribes) purely for ceremonial purposes, though Tibetan influence and culture are infiltrating here too, as at Rima, Shugden Gompa, and in Pachakshiri.

What becomes of the herds of kyang, antelope, gazelle, and the rest in winter? It is improbable that they roam the interior plateau at that season; if they did, they would find no food. Besides, there is ample space on the outer plateau and they doubtless descend to lower levels, taking the place of the nomads, who migrate still lower. Scanty as the herbage is even in summer, we know that large herds graze on the interior plateau and that nomad tribes hunt yak, *kyang*, gazelle, and other animals at that season, while nomad herders, known as "drokpa," visit the bleak outer plateau. There are no permanent settlements in the interior lake basin or on the outer fringes of the plateau where the eastern rivers rise. There are monasteries at the sources of Indus and Tsangpo by the Manasarowar lakes, but I suspect that these are not inhabited all the year round. In eastern Tibet there are a number of small, wooden, summer monasteries which are abandoned in winter.

It is on the settled areas of the outer plateau, in the high valleys and thence to the borders of the gorge region, that the principal grazing is found, between 12,000 and 15,000 feet, though in summer the grazing may go up to 17,000 feet. In the wet gorge region there is grazing almost as high, and in Chinese Tibet also. One must beware of a too exaggerated idea of the numbers of animals involved and not count the same camp more than once as it moves progressively higher and higher up the valley. Nevertheless, there is no doubt that the total number of domestic animals is considerable. It is however limited by the one obvious difficulty of winter feed. Everywhere in Tibet the winters are long and harsh. When the plateau is completely bare, if not under snow, the stock must be brought down to the village in the valley where there is little grazing and that of poor quality. In the gorge region, herds must descend to the forest belt where there is no grazing at all except in artificial clearings.

In north Burma, in the Seinghku and Adung valleys, where Tibetan settlers have made repeated attempts to keep yak, sheep, and goats, the summer grazing above 12,000 feet is adequate, if not good, but the grazing within the forest belt—the animals have to descend to 6000–8000 feet or lower in winter—is very poor, although extensive areas are kept cleared of forest by periodic burning. However, the north Burma settlers would doubtless have succeeded in permanently colonizing these alpine valleys for stock had they been able to protect themselves from the raids by Chinese from over the border. Very considerable changes in the vegetation have been brought about

here by man in his efforts to improve and increase grazing within the forest belt.

Three types of herdsmen are found in Tibet. The nomad drokpa or "dokpa" depend entirely on their herds, especially yak, for their livelihood. They live in black hair tents and wander over the wide pastures of the outer plateau, moving according to the season. The *tsamba* and brick tea they need are obtained by barter for yak products. Perhaps derived from the drokpa are the pastoral agriculturists who live in permanent villages at or near the limit of trees, where there is good grazing. These people, inhabitants of the rainy gorge region (*e.g.* in Kongbo), depend for their livelihood mainly on their herds, but they also cultivate a little grain. Even in north Burma the herds migrate up and down and the Tibetans cultivate gardens at 8000 feet. The third type of herdsman is the hired hand who looks after the animals belonging to the well-to-do townsman and to the officials, as well as those owned by the great monasteries in the populated areas. They are not themselves cattle-kings. These men take the animals up into the high pastures in the summer and come down to the villages and towns in the winter. It is probably almost true to say that in Tibet every man, unless he be a beggar or a felon, owns at least one animal. The townsman owns a pony, the villager one or several yak, sheep, or goats and probably a pony as well.

The following table gives an idea of the superficial areas of the six natural sub-regions of Tibet. They are calculated from the map "Highlands of Tibet and surrounding regions" published by the Survey of India (1936, 1st edition) on the scale 1 : 2½M. They are in round figures and are conservative estimates:

Interior plateau ..	260,000 sq. miles	Mainly desert.
Outer plateau ..	400,000 ,, ,,	Mainly grazing. Population on the outer fringe.
Rainy gorge region	46,000 ,, ,,	Largely forest.
Arid gorge region	30,000 ,, ,,	Largely semi-desert; but forested above.
Tsaidam	37,000 ,, ,,	Mainly grazing.
Chinese Tibet ..	92,000 ,, ,,	Grazing, forest; some cultivation. Fair population.
Total ..	865,000 ,, ,,	

It is likely that at least half the above area can be grazed for at least half the year. No doubt the answer to the puzzle of where the animals find enough food is in the vast area of grazing—some 400,000 square miles. Although the traveller in Tibet cannot fail to be impressed by the large herds of both wild and domestic animals, he is likely to be even more impressed by the apparently limitless grazing. Yet it is unlikely that Tibet could, as he might suppose, carry much more stock than it does already because of the problem of winter feed, though the matter is one which should be examined closely. Without huge supplies of fodder, most of which would have to be imported, it is probable that Tibet is already well stocked.

The summer grazing might be greatly improved. Whether the type of animal could be improved it is impossible to say until we know the present

yield and quality of milk, length and quality of hair or wool, disease incidence, and so forth, so that these too must be the subject of enquiry. Another interesting question is whether other animals could with advantage be introduced into Tibet; reindeer, for example, might to-day be imported by air.

Probably butter is the most important article of food produced in Tibet. It is impossible to estimate how much butter is produced annually, though I can vouch for its excellent quality. Every Tibetan eats, or drinks, butter. Every monastery burns butter in numerous small lamps, day and night, and makes images out of butter. At present neither butter nor milk is exported, but a certain amount of wool reaches India. That Tibet could export butter and milk, or perhaps *ghee* (clarified butter), to northern India and import kerosene to lighten her darkness seems reasonable. The one form of industrialism that Tibet could carry would be a home-canning, dairy-produce industry on a limited scale. But before even so small an adjustment with the modern world is attempted, it would be wise to review the whole question in the light of facts. Improvements might be introduced gradually, but we need first to know what it is we have to improve.

Apart from improving the herds, there is the possibility of improving the grazing; again, before that is possible we must know what effect grazing has on the vegetation of Tibet. Obviously the effects will be different in different parts, according to climate, type of vegetation affected, and the nature of the interference. The animals themselves have only two means of influencing the vegetation, by manuring the soil and by selective grazing. But man alters it in several ways, notably by destroying it and by camping on it. In selective grazing, certain species are rejected, others grazed and thereby destroyed or kept in check. At camping sites the animals are tied up at night and the ground is trampled, manured, and grazed. Manuring however has little effect as the droppings are collected for fuel. In forested areas, woody vegetation is cut and burnt to extend grazing, and considerable change results.

Alpine camp sites on the plateau show very clearly their effect on the vegetation. Above 14,000 feet in the rainy gorge region, a dense growth of *Primula Roylei*, a handsome, wine-purple-flowered species, always marks an abandoned camp site. Frequently the soil is made sour and yields a thick growth of Rumex, nettle, Polygonum, Artemesia, and similar widespread weeds. Another typical weed of yak camps is *Scopolia lurida* which in winter is cut down for bedding and fodder. *Hyoscyamus niger* is also an invasive domestic weed. It would be interesting to observe these sites through the year and to see what plants come up as compared with the surrounding vegetation and how far from the camp the influence of the tethered animals extends. In many of the alpine valleys, *e.g.* between the Tsangpo and the China Road east of Lhasa, hundreds of such camping grounds exist. Their total area is not inconsiderable.

I have long suspected that certain alpine plants comprising an enormous preponderance of a single species (or perhaps of two species) found in grazing country were somehow connected with the presence of herds, and on one occasion I saw the process, or one of several processes, at work. This was in the Assam Himalaya, where yak, grazing in June at 13,000–14,000 feet, refused to eat or even to nibble the leaves of *Primula Dickieana* which

occurred in myriads in the pasture, increasing as the ground became moister owing apparently to the cutting of the Rhododendron scrub. It appeared that this monstrous invasion of *P. Dickieana* was due to two factors connected with grazing: one, the attempts of the herdsmen to extend the grazing area by cutting and burning all scrub Rhododendron in the alpine region, where the tangled bushes grew from 3 to 6 feet tall; the other, the selective grazing of the yak. The Primula no doubt found the conditions ideal and needed little encouragement to become the dominant species.

In the same area, at about 10,000 feet, within the silver fir–Rhododendron forest, was a shallow meadow basin, very marshy in June. This too was a yak pasture and contained countless thousands of the dwarf *Primula Kingii*, a plant scarcely more than an inch tall but occurring in such incredible numbers —the plants often touching one another—that the meadow was reddened by their bell-shaped corollas. It was clear that yak trampling over the pasture did not eat this plant or prevent it from seeding freely; I found abundant good seed dispersing itself in October. It appears probable that unless a change takes place and another succession more favourable to grassland intervenes, these alpine pastures will cease to be grazing ground at all.

Another example of change brought about by the presence of herds in the Assam Himalaya attracted my notice along the cattle paths through the silver fir and Rhododendron forest at 11,000–12,000 feet, where two species of Primula, *P. strumosa* with yellow flowers and *P. Gambleiana* with violet flowers, grew thickly and also hybridized. Away from the cattle paths the plants were widely scattered and no hybrids were met with. But farther north I saw meadows almost solid with large tufts of *P. strumosa* which the yak had rendered not only dominant but exclusive. Here it particularly marked camping sites, as though yak dung had proved a magic manure, or possibly toxic to every other plant.

The invariable association of these invasive plants with grazing makes it almost certain that there is some connection between them. But what exactly the connection is I do not know. Here are a few more examples: (1) Above Shugden Gompa in eastern Tibet at about 14,000 feet, several acres in a moist shallow basin on the ridge were completely covered with a species of dwarf Aster, the plants touching one another. (2) In the Lunang valley and in Tsari, and elsewhere in southern and south-eastern Tibet, were millions of *Primula alpicola* mixed with scattered species of Iris, *Primula florindae*, Pedicularis, and a few other less conspicuous plants. (3) In the Assam Himalayas, at 9000 feet, a species of Ligularia (like Senecio) with large cut leaves occurred profusely in clearings in the forest; this may have been the direct result of clearing the forest rather than grazing, but yak were grazing here.

Another plant which comes up freely on old camp sites and where Rhododendron has been cleared is *Meconopsis grandis*, which appears to flourish only where the ground has been soured and on rubbish dumps. It has spread from one or two localities in Bhutan or Sikkim within the last century. Other plants apparently associated with clearing and grazing, or with either one, which come up in great numbers, especially in alpine regions, are species of gentian (*G. sino-ornata* and others in Tibet); various species of Pedicularis,

which however, being semi-parasitic, may be secondary arrivals; and *Primula denticulata* (not an alpine) which increases rapidly in burnt clearings at 8000 feet in north Burma. No doubt there are many more. The mere fact that a species occurs in great numbers is not, of course, proof of domestic grazing or clearing. *Primula atrocrocea* occurs in countless thousands on a certain alpine slope in the Mishmi Hills on the Assam frontier and owes nothing to man's interference. As this is a hunting district of the Mishmi tribe however, it is possible that the colonies of *P. atrocrocea* (and to a lesser extent of *P. calthifolia* which grows with it) owe their presence to wild herds, or even to a few herbivorous animals or to ground feeding and scratching birds.

It may be noted that the mere clearing of forest above 8000 or 9000 feet in this type of country lets in certain less desirable herbaceous plants which become more or less dominant, and that clearing combined with burning lets in quite different species. The grazing of herds, the regular passage of herds to and fro, and the regular encampment of herds have each a different effect on the vegetation.

Whether, when one species completely covers the ground, *e.g. Primula Dickieana* or the dwarf Aster referred to above, the pre-climax remains stable is impossible to say at present, but it probably does so long as the same cause operates. A stage must eventually be reached when animals will no longer attempt to graze over these areas at all; and once the original cause ceases to operate there will probably be pressure from a new direction, initiating a new succession. Plant colonies, not only in the alpine region, seem to appear and disappear for no known reason. As examples I may mention the ground orchid *Paphiopedilum Wardii* which in 1930 was abundant in its type locality in the hills north-east of Fort Hertz; in 1937 I could find hardly a single specimen there. Again, *Meconopsis betonicifolia pratensis*, which was certainly not abundant in the Senighku valley in 1926, had greatly increased by 1942; by 1950 it may be extinct there. However Meconopsis is not truly gregarious.

In order to make the most of the extensive and probably rich grazing in Tibet and on the flanking ranges in the Assam Himalaya and north Burma, observations combined with experiments extending over several years are essential. It would probably be true to say that both the herds and the grazing could be greatly improved within a decade or two; certainly rotation grazing, not now practised at all so far as I know, could be introduced.

Although it is improbable that the Tibetans themselves are short of fats in their diet, nevertheless it seems a waste to use so much butter, a highly nutritious food, for ceremonial illumination and decoration; necessity, not religion, demands it. Kerosene would do equally well for the one, tallow for the other. The price of these articles, even before the war and on the main trade routes, was however prohibitive.

Enough has been said, it is hoped, to indicate an interesting line of research and a field for enterprise on the part of the Tibetan government which could be started without upsetting the economy of the country, bearing in mind that Tibet is an undeveloped pastoral land.

THE HILL VILLAGES OF ENGLAND AND WALES

DOROTHY SYLVESTER

THE CITY SET ON A HILL was long one of the principal types of urban settlement because of its advantages for defence and a common preference, especially among hill peoples, for such high places for religious worship. Even in lowland areas, immigrant hill peoples continue the tradition of a sacred "high place," constructing it artificially where Nature has failed to provide it, and not a few lowland towns and villages in this country are grouped round an elevated church or a medieval fortification on a natural height or an artificial motte.

The study of the hill village has however been relatively neglected.[1] Yet, with its self-evident disadvantages for agriculture and life in a peaceful countryside and its aesthetic recommendations, the origin, history, and survival of the hill village offer intriguing problems. Well over a thousand such villages and hamlets exist in England and over two hundred in Wales.

The matter of definition is less simple than might at first appear. The term "village" has been given a wide rendering in the present study, to include the hamlet on the one hand and the small market town on the other, but larger centres such as Denbigh and Launceston are excluded though their history and character are germane to the subject. Among the less obvious cases to be included are the mining or quarrying villages which are not part of or close to a conurbation, and the lonely church or the church with only a parsonage and perhaps one or two houses near to it, if it has parochial status. Many villages are economic hybrids and these too are included, but the number of non-agricultural or semi-agricultural hill settlements is too small to affect the balance of the map as a rural distribution (Fig. 3) except in the Snowdon and the Wrexham districts where nearly all the villages shown owe their origins to extractive industries. As regards site, on which selection primarily depends, the definition used is relative elevation rather than considerable positive altitude and in doubtful cases, of which there are many, the determining criterion has been that the ground should slope downwards from the site through a total angle of more than 180 degrees. Most saddle villages and all high-valley villages are thus excluded. The most difficult distinction to make is between the high valley-side and the hillside village and each example must be judged on its merits. A classification of sites has been adopted for the purposes of mapping which includes seven high site-types: hill-top, ridge-top, ridge, spur, hillside, plateau, and commanding positions difficult to classify; and two lowland-elevation types, marsh-island sites and elevated positions, the last in each group being made general to include difficult cases.

[1] A paper on the Hill Villages of England was read to Section E of the British Association at Blackpool in 1936. The present paper, while incorporating much of the material then used, represents a considerable extension of the work done and conclusions reached by that date.

One most significant fact emerges immediately; that is, that the high moorland zone above 1000 feet is virtually deserted. Only eight rural hill settlements in England lie above this height, and fewer than forty lie between 800 and 1000 feet (Fig. 1). In Wales numerous settlements lie between these latter limits, but apart from quarrying and mining settlements and scattered hamlets only two are to be found above 1000 feet.

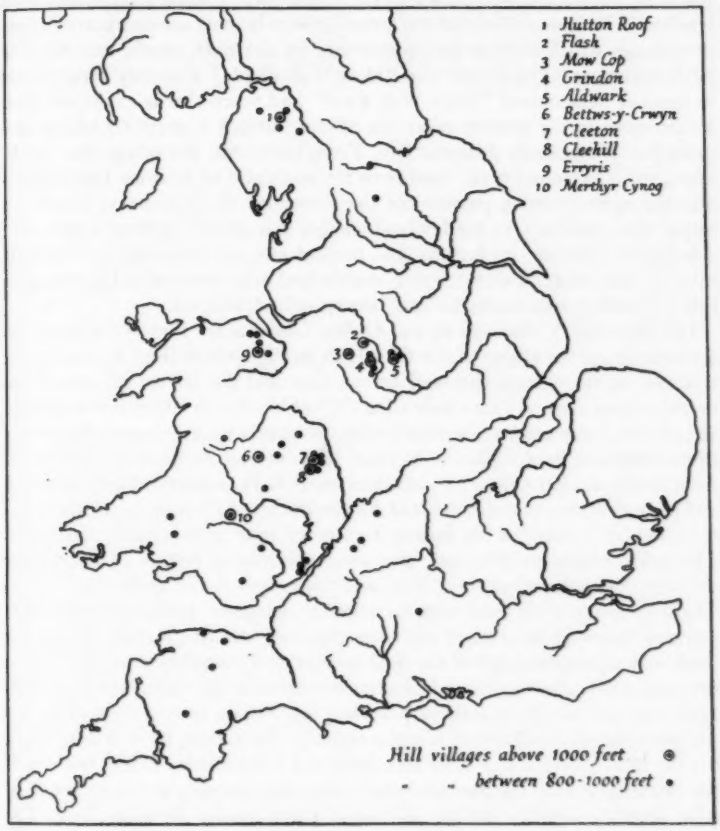


Figure 1

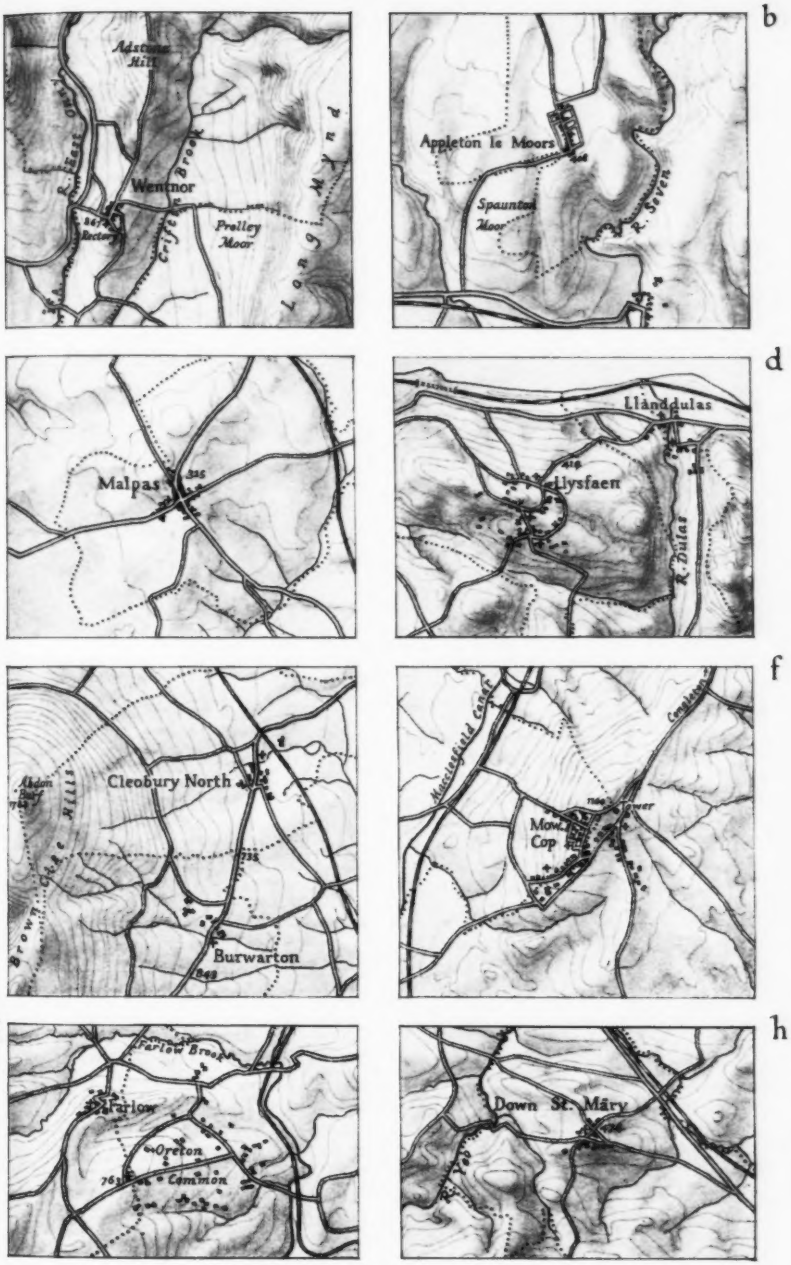
The question of the hill village can perhaps be presented most effectively at the outset by the description of some actual cases.

Wentnor in south Shropshire is a solitary hill-top village of predominantly pastoral type (Fig. 2a). It occupies the highest point of a promontory with a north–south alignment on the south-western edge of the Long Mynd. The hill slopes on three sides of the village fall steeply to valleys whose small streams, the East Onny and Criftin Brook, have been partly responsible for its circum-

denudation. The church stands at the highest point of all, 867 feet above sea-level, and is dedicated to St. Michael. The now small, bleak, and rather poor village lies behind the church to the north and the Rectory is on the southern side. On the south-western slopes just below the Rectory garden are traceable parallel lynchets of the uneven chessboard type. These are approached from the open pasture of Wentnor Green to the north-west by a sunken road which probably led as a double lynchet-way to a long barrow at the level of the lowest lynchet. The line and level of the second lowest lynchet are continued in field boundaries which encircle the promontory on the west, south, and north in fields known as "The Cross" and "Holy Wall Field." The only break occurs in another field named "Holy Wall Field" and when this is examined from Prolleymoor in the eastern valley the missing stretch is perfectly visible as a grass-line of markedly different hue. From the north, the village can still be approached by an old green road from the moorland of Adstone Hill which is also the open common pasture for the township. At Domesday, Wentnor's importance relatively to the lowland villages was greater than now but, considering its altitude, its fertility and present size are remarkable. The tithe map of 1846 suggests that common arable land may have existed at one time, but the field system seems to have been poorly developed.

Cleobury North, *Burwarton*, and *Oreton Common* are three contrasted hill settlements on the slopes of the Clee Hills in Shropshire (Fig. 2e and g), the first two on the eastern slopes of Brown Clee and the last on the east of the neighbouring mass of Titterstone Clee.[1] Cleobury North village lies at a height of 700 feet above sea-level and its lands consist of a wedge-shaped slice of the upper slopes of Brown Clee as do those of most Clee parishes. Fields extend from approximately 550 feet to 1000 feet above O.D., succeeded by plantations and open common to the summit of Abdon Burf, 1784 feet high, which is surmounted by a camp of the inturned-entrance type now partially destroyed. The fields, which are irregular, give some evidence of former co-aration but this was ill-developed or short-lived and the proportion of arable land is low. The upper edge of the field-zone is fringed by squatters' holdings, less numerous now however than when the tithe map was drawn in 1846. A contour road links this upper edge of the field-zone with the neighbouring parishes at the same level. Above this, old plantations extend to an altitude of more than 1500 feet within the moorland pasture. The village is not large, but is a distinct community clustered round a church. Burwarton, its near neighbour, has the same physical character and displays a comparable belting, but it is of the estate type with no true nucleated village community and with much of what should normally be the field-zone taken up by demesne land. The southern mass, Titterstone Clee, though in many ways offering parallel conditions for settlement, has a higher proportion of inferior land and is also rich in "dhustone," and vast, irregular settlements of squatters have developed around the commons at varying altitudes. No other part of England offers more spectacular instances of this ugliest of rural settlement forms and Oreton Common is a characteristic example. It is a township within Farlow parish and lies at a height of between 500 feet and 700 feet on the lower slopes of this

[1] Dorothy Sylvester, "Rural settlement in Shropshire," *Trans. Shrops. Arch. Soc.*, 4th series, 11 (1928) 213–56.



Parish boundaries .....

Miles

1 ¾ ½ ¼ 0 1 2

Figure 2

typically wedge-shaped area to which ecclesiastically it belongs. The settlement is roughly circular and its holdings are the characteristically untidy and irregular checkerboard of small enclosures of the close or paddock type, each adjacent to a tiny cottage. The "village" has no central point other than the open common, no parish church, and no squire.

On the border of Cheshire and north Staffordshire the village of *Mow Cop* occupies a hill-top 1091 feet high (Fig. 2f). The hill is physically part of Congleton Edge, a line of tilted gritstones bounded westwards by the Red Rock fault which sharply divides this last flank of the Pennines from the Cheshire Plain. It is a landmark visible from over half Cheshire and much of north Staffordshire and north Shropshire and it is approached from the plain by a road with an average gradient of 1 : 7½. The village is large, its stone and brick cottages clustered round the rocky, knife-edged summit of coarse red gritstones surmounted by what appears to be a ruined tower. At first glance the village seems to be a perfect defensive settlement, but although stone querns of early Iron Age date have been found here and quarrying probably continued spasmodically after that, it seems unlikely that the hill was inhabited except by a few small hill-farmers and squatters until the eighteenth century when the north Staffordshire coalfield began to be developed industrially. The land which it occupies on the Cheshire side is the open common pasture of the parish of Odd Rode, or such it was until the comparatively modern village of quarrymen and miners arose on the hill-top. The tower is an artificial ruin constructed about 1754 by the then squire of Rode to improve the view from his house. Mow Cop is probably unique as a hill village in that it lies across a fourfold boundary line dividing two parishes, two counties, two dioceses, and the two provinces of Canterbury and York.

In North Wales is the village of *Llysfaen* near Llanddulas (Fig. 2d). It is a hill-top village but has every appearance of being an extensive squatting community. Scattered cottages with irregular closes and a few small holdings have suffered the later addition of quarrymen's cottages. The road plan is roughly that of two ellipses swung from a single point, the inner one surrounding a high, rocky central hill. There is no evidence on the ground of any old village or field system and large areas still remain open common land. But the church on the northern, seaward side of the village is of old foundation, hence the question arises: Was the church the centre of an old, pastoral, hill-top community now obliterated by a later, extensive squatting settlement?

By no means all hill villages however are in the pastoral zone and many are associated with a fully-developed system of common arable fields or a high proportion of arable land or both. Such is, for example, the village of *Appleton le Moors* [1] at an altitude of 400 feet above the valley of the River Seven where it crosses the Tabular Hills to reach the Vale of Pickering (Fig. 2b). This village has a geometrically perfect three-field system. *Down St. Mary* in the Vale of Devon, and a large group of similar villages on the dissected plateau around it, are equally adaptable to pasture or cropping and have in fact a high proportion of ploughed land. The same adaptability is found in the areas farmed from the elevated lowland villages and the villages are placed high either to avoid

[1] Elsie Halliwell, "The upper Derwent basin of north-east Yorkshire: a study of village settlements," pp. 81–7. (Unpublished B.A. thesis, University of Liverpool, 1927.)

marshy ground, as in the cases of the marsh-island settlements of the Fens, the Plain of Somerset, and the Gowy Valley, or for traditional reasons or both.

In many cases hill villages, far from being remote, form the focus of road systems, especially where elevation and gradients are not too great, though these do not always prove prohibitive. Such villages may develop into market towns or acquire other functions which are non-rural. *Malpas* in Cheshire was in medieval times both a fortress and a market town (Fig. 2c). Set slightly to the southern side of a low hill 400 feet high in the western plains of Cheshire, the church dominates the little town. Its British name was *Depenbach* but when its castle was built in the eleventh century by Hugh, the first Earl of Chester, it took its name from the "bad pass" which, with two other castle-towns, it became its function to defend. The retail market lapsed about 1870 and now it retains only a cattle market held near the station some distance from the village. Malpas has lost its local strategic importance and the main roads now by-pass it, but it still has all the appearance of a country market town and functions as a shopping centre for the villages around. For six hundred years a double rectorate, it is now only a single benefice.

It is evident that hill villages have both advantages and disadvantages. Many high villages share certain disadvantages; steep approach and the consequent difficulties of transporting loads to the village and of reaching it on foot from the main road; the usual but by no means universal remoteness from the main arteries of trade and social life; the scarcity or absence of surface water supplies for man and beast, the need for deep wells and the early failure of even this source of supply in periods of drought; the thin soil cover and rapid depletion on high, steep slopes; the difficulty of finding an adequate acreage for food crops to supply even a small community; the general poverty of agriculture; exposure to wind and weather, low winter temperatures, the late spring and the consequent reduction in the range and yield of crops; the need for strong buildings and frequent repairs; the dangers and disadvantages of being cut off from supplies in periods of snow and flood. Such are the drawbacks which have so often brought about depopulation and decay, caused houses to be deserted and lanes to become weed-ridden and brought about the abandonment of once comparatively well populated upland areas. Such in particular are the disadvantages attendant on living in villages of the summit types and those of considerable altitude and steep approach.

The plateau villages are in different case, especially those situated at moderate altitudes. They suffer necessarily from the problems of water supply, remoteness, and exposure, but they may occupy fairly level land which at intermediate altitudes can prove perfectly suitable for deep ploughing and will yield ample crops. In many plateau areas, such as the "Vale" of Devon, the level uplands of the Cotswolds and the Gog Magog Hills, it is the valleys which offer the real obstacles to communications, while the best roads as regards surface and gradient are on the open stretches of the plateau. Consequently hill settlement, far from being abnormal, is the most suitable for such relief forms as plateaux and broad ridges. Hillside settlements on steep escarpments in many instances combine nearness to the spring line and to the level land of both upland and vale. Lowland sites which avoid badly drained land by building on elevationss imilarly combine advantages, and many elevated

sites in lowlands were chosen by early settlers for their strategic and agricultural facilities. In well-drained lowlands and droughty uplands the advantages of elevation are less evident and many of the elevated villages in such districts appear to be due to late settlers having perforce to take what land was still unclaimed.

Hill villages vary greatly in aspect, economy, and function as well as in location but certain types are recurrent: the old pastoral village (Wentnor, Shropshire; Middlesmoor, Yorkshire; Llanelian-yn-Rhos, Denbighshire); the irregular squatters' settlement of Elizabethan or later date (Oreton Common and Cleehill, Shropshire); the hillside farm group characteristic of Wales (Guilden Down, Shropshire; Llechcynfarwydd, Anglesey); the roadside and cross-road hamlet (High Lane, Worcestershire; Bethel, Anglesey); the mixed agricultural village indistinguishable in economy from its lowland counterpart (Appleton le Moors, Yorkshire; Norbury, Cheshire; Sadberge, Co. Durham); the quarrying or mining village only occasionally pre-industrial in origin (Mow Cop, Cheshire–Staffordshire boundary; Dinorwic, Caernarvonshire; Brymbo, Denbighshire); the defensive centre sometimes declined to a village, sometimes grown to a town (Halton, Cheshire; Bolsover, Derbyshire; Denbigh town); the market town (Shaftesbury, Dorset; Stow on the Wold, Gloucestershire); and former market village (Malpas, Cheshire; Brill, Buckinghamshire; Chagford, Devon); the religious centre of more than parochial importance grown from a well-placed village or established as such (St. Asaph, Flintshire). Many villages combine two or more of these characters (Audley, Staffordshire). Some are minor groups of negligible size, perhaps a church and an odd house (Brentor, Devon; Penterry, Monmouthshire) or a small hamlet. Others are comparatively large and flourishing centres, urban rather than rural in character (Launceston, Cornwall; Denbigh).[1]

The problem of hill villages may be discussed with reference to four questions: (1) where are they found; (2) what physical factors underlie their distribution; (3) what is their plan and what is their agrarian pattern; (4) what is their history and origin and with what racial and cultural groups are they associated?

The first of these is the key question and is answered cartographically in Fig. 3, though its significance can only be brought out by a discussion of the other questions above and by correlating it with other distributions. The map at once reveals that hill villages are distributed neither evenly nor in response to any one set of conditions. Some occur independently, others are massed in large groups; some are in strings, others in clusters. Certain blank areas strike the eye immediately: the northern and central Pennines, the Lake District, the higher Welsh Uplands except for occasional scatterings; the Eastern English lowlands apart from the Fens. In the one case an altitude too great for profitable agriculture and in the other a terrain lacking suitable eminences are primary physical reasons. Relatively few elevated villages are found in well-drained lowlands or in highlands above one thousand feet in height in any part of the country. With the exception of the lowland types (shown by open

[1] Fig. 3 shows settlements which are rural or partly rural in character; thus the smaller market towns are included, with extractive centres which are small and in a rural setting, and some hamlets; many lesser hamlets are omitted.

symbols) most of them favour lands of intermediate height or relief where suitable sites occur within the altitudinal limits of agriculture. In the North of England they are found on the fringing slopes of uplands; in Cumberland on the western flanks of the Pennines and the northern slopes of the Cumbrian Massif; in North Yorkshire on the coastal slopes of the Cleveland Hills and the upland edges of the Vale of Pickering; on the gentler eastern slopes of the Pennines principally in County Durham and around the southern Pennines with only a thin scatter east of the central Pennines. South of Shap the steeper western Pennine Edges are generally unfavourable for hill settlement and only two groups occur along the whole extent of the western Pennine flanks, a small group overlooking the Ribble Valley from the northern slope of Rossendale and another on the north Staffordshire Pennine Edge. The latter is continued around the southern and south-eastern end of the Pennines in the important concentrations of Derbyshire and Nottinghamshire.

In the great *Midland Triangle* of ancient woodlands between the lower Severn, the Midland Gate and the Oolithic Limestone escarpment hill villages occur only thinly except in the Welsh Border counties west of the River Severn, but there is a scattering of elevated lowland types especially in the western parts in Cheshire and north-east Shropshire where a tradition of church-building on high points is notable. In the Scarpland regions, that is, south-east of the Tees–Exe line are found the largest groups of hill villages in England apart from those of the western counties. From north Yorkshire they continue along the Oolitic Limestone escarpment and are particularly closely distributed from south of Lincoln City to the southern end of the Cotswolds. Over most of the chalk uplands they are widely and in some areas densely distributed. They are found also in the Weald and on many of the minor limestone and sandstone ridges and outlying hills in the Mesozoic rock area, but within this region as a whole can be distinguished one of major concentration in a triangle between Spurn Head, the Naze, and the Mendips, where plateau and hillside types are located on almost all elevated land. From the eastern half of East Anglia, Salisbury Plain, and the south Dorset Downs they are generally absent.

In the south-western counties of Cornwall and Devon hill villages are densely distributed, and if the higher infertile moorland areas of Exmoor, Dartmoor, and Bodmin Moor are excluded, they may be seen to form a dense belt throughout Cornwall and central Devon.

The last area, Wales and the border within the curve of the Severn is one in which contrasts are again evident. The higher lands above 1000 feet are almost devoid of hill villages (Fig. 3) but in the lands of intermediate height, which are principally on the outer edges of the Welsh massif, their distribution is significant: they are conspicuous in North Wales from Flintshire to Anglesey, in South Wales from Monmouth to Pembroke, and in the southern border from Monmouth to south Shropshire.

In three regions hill villages may be considered the rule rather than the exception in settlement: in the Flintshire plateau; in the uplands which lie across the borderlands of south-east Shropshire, north Worcestershire, and north-east Herefordshire; and in the Vale of Devon. All of these offer plateau or upland surfaces which are more level than the difficult valleys which inter-

Llechcynfarwydd
Bethel
Dinorwic
Snowdon
Denbigh
Montgom
Exmoor
Marianstleigh
Hembworthy
Coldridge
Down St Mary
Iddesleigh
Chagford
Launceston
Brentor
Bodmin Moor
Dartmoor

HILL VILLAGES OF ENGLAND & WALES
• Hill top ▲ Ridge top ▲ Ridge
v Spur ♦ Hillside – Plateau
+ Commanding position difficult to classify
Lowland Types
○ Marsh 'island' type
□ Elevated position
Hett
Trimdon
Hamsterley
Heighington
Shap Fells
R. Tees
Sadberge
Cleveland Hills
Appleton le Moors
Cropton
Vale of Pickering
Middlesmoor
R. Ribble
R. Ouse
Rossendale
Pontefract
Spurn Head
The Peak
Halton
Barlborough
Bolsover
Congleton Edge
Palterton
Rowthorn
Lincoln
Mow Cop
Mansfield
Waddington
Harmston
Audley
Alfreton
R. Soar
Wrexham
Nortbury
The Wash
Grantham
Prees
Midland Gate
R. Trent
Vale of Belvoir
Charnwood Forest
The Fens
Woolstaston
Ch. Pulverbatch
Kenley
Wentnor
Brown Clee
Cleobury North
Nev.ll Holt
Dingley
Burwarton
Oreton Common
Bayton
Lamport
R. Teme
Mamble
Grey Mares Hills
R. Ouse
High Lane
R. Wye
Ashridge
Stow on the Wold
The Naze
English Bicknor
Forest of Dean
Brill
Whitchurch
St Bruvels
Vale of Oxford
Eastcombe
Chilterns
R. Lea
R. Thames
Penterry
Bagshot
North Downs
Mendips
Salisbury Plain
Plain of Somerset
The Weald
Shaftesbury
South Downs
R. Rother
St Mary
R. Exe

Figure 3

sect them. (Compare the Cotswolds, the Chilterns, and the Gog Magog hills where the result is also the local predominance of hill settlement.) But over the greater part of the country hill villages are found in strings or in small groups and are the exceptional rather than the normal form of settlement.

A distinction must usually be drawn between villages which occur singly and those which occur in groups of closely similar settlements. Single villages are often highly individualized, whereas the groups show a common relationship to the terrain in site type and in economic and cultural character. The implications are self-evident and the location of each type is significant. The single villages can only be explained in relation to particular conditions such as the occupation of a commanding site unequalled in the district (*e.g.* Middlesmoor, north Yorkshire; Prees, Shropshire; Alfreton, Derbyshire). They may have acquired outstanding local importance in relation to communications, ancient commerce, religion, or defence, or they may have survived because of the strong attachment of the community to its soil, an attachment dependent on almost unconscious reasons defying external analysis. By contrast, villages which occur in groups indicate a general response to conditions favourable to upland colonization over a considerable area; for example, the plateau villages of the "Vale" of Devon make use of the level ploughland of the upland surfaces and avoid the ravine-like valleys which intersect them; and the hillside villages of the scarp slopes of the Oolites take advantage of the spring line, avoid building on the wetter clays of the vale, and farm the level tracts of both the uplands above the scarp edge and the lowland below. Villages on narrow ridges with some level top land compare with both; for instance, the line of villages south of Lincoln on Lincoln Edge including Harmston and Waddington, linked by a main inter-parochial road running almost parallel to the Roman Ermine Street, a fact which demonstrates one of the persistent advantages of such sites. There might also be compared with this the line of villages between Mansfield and Pontefract on the narrow outcrop of Magnesian Limestone or near to its junction with the Carboniferous rocks, including Barlborough, Palterton, and Rowthorn.

By no means all groups however are merely the result of like physical conditions. Downhill movement in several directions from a prehistoric hill nucleus is strongly suggested by the arrangement of hillside villages around the Clee Hills and the same may be the origin of the spur villages at the northern end of the Long Mynd of which Church Pulverbatch and Woolstaston are the most striking examples. But the distinction is not destroyed by such intermediate cases.

Of the geographical conditions underlying the distribution of hill villages there have already been mentioned the rougher and less hospitable character of the highland zone, sufficiently rigorous to repel hill settlement except in times of disturbance when military necessity became paramount and hills were fortified especially along the border zones and near main routes. Hence it is not surprising to find a high percentage of the hill villages in the gentler lands of the south-east, the warmer peninsulas of the south-west, and the hill borders of the north-west rather than in the high bleak cores of those uplands. Hill villages persist where slope, soil, water supply, and climate permit agriculture to be carried on, therefore geological conditions are also of prime importance.

There is a marked concentration of hill villages on sandstones and limestones especially where these rocks carry good, deep soils in localities neither too high nor too remote to favour the continuance of village life. Where the chalk bears poor soils and wide stretches are out of reach of surface water, as on Salisbury Plain, hill settlement has retreated, preferring adjacency to lowlands or uplands with good soils and a reliable water supply. There are however exceptional cases hard to explain on physical grounds, especially in the north and west, and here traditional factors must be invoked. These exceptions apart, the limestone and sandstone uplands can be shown to carry the greatest number of the English hill villages and a certain number of the Welsh. Hill villages are found on the Carboniferous Limestone of the Peak District and the Mendips; on the Magnesian Limestone plateau of County Durham; on the narrow outcrop of the same rock round the south-eastern flanks of the Pennines; on the west of the Flintshire plateau; on the narrow ridge within the vale of Belvoir between the River Smite and the Grantham Canal (an escarpment of Lower Liassic rocks, predominantly limestone, overlain by glacial clays); on the sand and limestone rocks of the Lower Oolites—the most striking line of all; on the lower ridges and outlying hills of various limestones and sandstones emerging from the floor of the Great Clay Vale between the escarpments of the Lower and Middle Oolites and the Chalk (Whitchurch, Brill, and Ashenden in Buckinghamshire occupy low outliers of the Portland Beds, in some places capped with Purbeck Sands or Lower Greensands); and lastly on the Chalk itself.

The sandstone areas rank next in importance. Hill villages are found on the Devonian sandstones and grits of south Shropshire (the Clee Hills), Herefordshire, the lower Wye Valley, Cornwall and Devon; and on the Yoredale Sandstones of Northumberland and the Culm Measures of the Vale of Devon where the sandstones generally form the upland surface, the shales outcropping in the valleys. They are rare, though not absent, on the millstone grits and coal measures of the Pennines, partly at least on account of poor soils and altitude. The lower Triassic sandstones in general seem to be too coarse and too hungry to provide a good basis for farming but a few exceptions occur in north Staffordshire. The Keuper Sandstones bear hill villages in Cheshire, Shropshire, and on the southern slopes of Charnwood Forest. Within the younger rock areas hill villages occur on the Purbeck Sands, the Lower Greensands, and the Hastings Beds. The harder, more resistant rocks of the highland zone have poorer soils and the sinking of wells is correspondingly difficult on elevated sites; hence, where these advantages are combined with great altitude and climatic exposure, hill settlement is absent from wide areas, as it is from the greater part of the higher Welsh uplands and the high Pennines. Where hill villages do occur they are found to correspond strikingly with the outcrops of limestones and sandstones. With rare exceptions the moorland zone above 1000 feet is without hill villages, whereas in prehistoric times hill forts were numerous above this height.

A further reason for the colonization of upland tracts of limestone and sandstone was doubtless the comparatively open nature especially of the limestone heights. Thus in Fig. 3 the close grouping of hill villages on the Oolitic Limestone escarpment contrasts significantly with the almost blank area of the

Midland Triangle. But the assumption that hill villagers, like the earlier hill-top settlers, were seeking among other advantages that of open country above the woodland does not always hold good, for one of the densest nucleations is found in the Shropshire–Worcestershire border area which remained forested until a very late period. Some parts of it were cleared in late medieval times, others in the eighteenth century when orchard settlements began to extend, while parts of Wyre Forest are still virgin woodland. For many miles on either side, the Teme drains low uplands of Devonian rocks where the valley village is almost unknown except on the wider flood plains and hill settlement is normal. The settlements originate from various periods but the main villages are Anglo-Saxon or earlier (*e.g.* Bayton and Mamble). The Forest of Dean also provides some striking examples of hill villages within the main extent of woodland (*e.g.* English Bicknor and St. Briavels). In both areas the wealth of timber and the fruit-growing and woodland industries still reflect the original woodland environment.

Sufficient has been said to suggest the variety of plan, aspect, and function of rural hill settlements. Many are at relatively low altitudes or occupy land which is sufficiently level for them to differ little in appearance or agrarian plan from their lowland neighbours, for example the Lincoln Edge villages such as Waddington and Harmston. Others are isolated and are distinguished by their height and commanding position, for example Shaftesbury, Dorset; Middlesmoor, Yorkshire; Wentnor, Shropshire. Some flourish, some decline and in these last an air of melancholy is present in their grass-grown lanes, their decaying buildings, and a sense of forlornness born of forgotten times.

It would be unwise to apply any generalization—other than common elevation—to all hill villages, but one or two features at least are encountered constantly. In those which have parochial status, the church is almost invariably at the highest point of the village. A few cases may in fact be deemed hill villages because of the elevated situation of the church although the houses straggle down to low land, and in many lowland and valley villages the hill tradition would seem to be perpetuated in the location of the church on an isolated mound (*e.g.* Barthomley, Cheshire), or on a far hill (*e.g.* Brentor, Devon). Lack of surface water is so general as to imply the universal need for wells and for some artificial means of watering animals in almost every hill village. Many houses have private pumps, but the public pump is usually a central feature and often very elaborately constructed or covered, while stock are commonly provided for by a dewpond near the centre of the village. The boundaries of hill parishes or townships vary in character, but unlike those of valley villages they rarely follow a stream of any size or show any relation to a valley course. The boundaries of summit villages normally include the entire hill and where groups of similarly sited villages occur their boundaries typically divide the hill tracts into approximately equal parcels. The two groups of hillside villages on the twin heights of the Clee Hills in Shropshire (referred to on pp. 78 and 83) show an almost perfect radial division of each hill mass though lower boundaries bear little relation to physical features.

The economic character and the pattern of land use in hill townships are also varied. The more elevated types are typically pastoral but the plateau and lowland types may include a good proportion of arable land. Where pastoralism

is dominant the villages are sometimes found to be clustered around a village green on which cattle were formerly herded at night for protection. The distribution of village greens has yet to be plotted, but they are certainly well represented in the east of England. At Heighington, Hamsterley, Hett, and other elevated pastoral villages in County Durham the greens are usually rectangular and of enormous size. Greens are found also in valley and lowland villages in County Durham, where they are generally considered a response to border raids. Their form however is so similar to that of green villages in the north-eastern German Plain (compare for instance the plan of Trimdon, County Durham, with those of Petersdorf and Neu Lagow, Brandenburg) that this plausible explanation appears to need further investigation, especially as the village green is so little developed on the Welsh border.

As regards the field plan, the older as well as some of the later villages failed to adopt or to preserve a common arable field system so ill-adapted to their topographical and economic character; for example, Kenley and the Clee Hill villages in Shropshire (a county in which the three-field system did not have a strong hold) and Cropton, north Yorkshire, where the site is bleak and difficult of access. But where the village was at a low altitude or the township boundaries included good level land co-aration became equally or almost equally as important as in the valley and lowland villages; for example, Appleton le Moors, north Yorkshire, 400 feet high, of which the tithe map shows a three-field arable system similar to that prevailing in the neighbouring lowland villages and unlike its neighbour, Cropton. The hill township may in fact display an agrarian pattern (*a*) comparable with that of the adjoining lowlands but modified with increasing slope and altitude to the needs of a more pastoral economy; (*b*) more archaic in the case of villages of truly ancient origin; (*c*) of more recent type in cases where the hill villages represent a late phase in the colonization of the region.

The nucleated village in various forms, with or without evidence of co-aration, is usual but not universal in hill settlement. There are also a great number of hamlets; that is, minor compact groups lacking parochial status but in most other ways an imperfect copy of the true villages (*e.g.* Coldridge, Wembworthy, and Mariansleigh, Devon). Occasionally hill townships are of the scattered type, such as Dingley and Lamport, Northamptonshire, and Nevill Holt, Leicestershire, this last dispersed round a hill-top church.

The question of the origin and history of hill villages hinges first on the reasons for hill settlement. The principal reasons which prompted the building of hill towns in ancient times were defensive and religious, and defence was unquestionably the reason for the occupation of many lesser settlements; their continuation rather than their origin probably depending on the religious factor. Inter-necine or inter-tribal warfare or foreign invasion has created the need for defence at many periods in the history of England as of other countries —in the Neolithic Age, the Bronze Age, the Early Iron Age including the Romano-British phase, and during the Anglo-Saxon invasions. In early Norman and Edwardian times defensive sites were occupied not by the native defender but by the alien invader. The earlier were often community living sites; the latter were sometimes planted in an existing settlement and sometimes became the focus of a new settlement more urban than rural in character.

Only comparatively rarely have these last given rise to permanent rural communities. Indeed the main periods during which hill communities sprang up for purely defensive reasons were pre-Saxon. The medieval castle, like the prehistoric hill fort, is now outmoded as a defensive work, but many villages still bear the mark of their defensive origin. Abdon Burf crowns the heights of Brown Clee where the village communities have shifted downhill to become hillside groups. Many other prehistoric forts have ceased to have geographical or any other connection with present-day settlement. Numerous Norman castles are equally isolated and derelict, for example Caus Castle on the Long Mountain. Some are mere picturesque ruins surmounting a hill or a motte within a lowland community, for example Montgomery. Occasionally the castle is still in geographical association with a hill village, as at Halton (Cheshire) and Bolsover (Derbyshire), but its former functional or economic significance has vanished.

The relationship between the present villages and the ancient hill camps is complex. On the subject of prehistoric hill forts there is now an impressive body of literature, much of which is of considerable relevance to the present study.[1] It is perhaps rather startling to find how far behind is the study of existing hill villages and hill towns in this country,[2] and how few attempts have been made to establish a connection even for individual sites. With this in view, the writer has compared the distribution of prehistoric finds and occupation sites for all periods with the distribution of hill villages, and from the results (too extensive to be considered here in detail) no single answer emerges for England as a whole. In many cases there is regional correspondence, as in the Cotswolds, but there are equally sharp divergences and all degrees of partial correspondence. In Northumberland, one of the more important areas for the development of small hill forts,[3] hill villages (especially summit villages) form only a light distribution, and in the Vale of Devon, where hill camps were by no means numerous, hill villages reach a maximum density for England.[4] Defensive needs have long lapsed and economic needs have replaced them; hence the hill forts in the moorland zone and those on inaccessible sites were abandoned centuries ago. Even in this country, where continuity of settlement over long periods is remarkable, the desertion of villages is far from unknown in areas above 1000 feet, in remote valleys, and in regions where border raiding was prevalent.

The general disparity between the distribution of prehistoric and existing hill settlement in England makes it clear that in a very large number of cases no continuity of site occupation can be argued. Even in prehistoric hill forts used in successive periods, occupation levels are commonly divided by sterile

[1] See particularly Christopher Hawkes, "Hill forts," *Antiquity* 5 (1931) 60–97; R. E. M. Wheeler, "The excavation of Maiden Castle, Dorset: First Interim Report," *Antiq. J.* 15 (1935) 265–75; Hawkes, Myres, and Stevens, 'St. Catherine's Hill, Winchester,' Winchester, 1930.

[2] O. G. S. Crawford, "Our debt to Rome," *Antiquity* 2 (1928) 184–6, and "An English hill top town," *Antiquity* 7 (1933) 347.

[3] V. Gordon Childe, "Excavations at Castlelaw, Midlothian and the small forts of north Britain," *Antiq. J.* 13 (1933) 1–12.

[4] See the map of Iron Age B South-western Culture showing camps with inturned entrances by Miss L. F. Chitty in Sir Cyril Fox, 'Personality of Britain' (3rd edition), Cardiff, 1938.

layers. Domesday Book provides numerous examples on the Welsh border and in northern England of sites formerly occupied which were waste in 1086, and while many of these were later re-settled others were abandoned permanently. The same source provides many instances of older hill villages which were at that time larger in relation to the lowland villages than they are to-day. The progressive downhill movement culminating in the Anglo-Saxon colonization of the valleys was later broken by some contrary movements from time to time—as early for instance as the late phase of Anglo-Saxon settlement—but by the end of Norman times the great days of village building were past and the later settlements were rarely if ever true communities. Further, the status of upland farming has declined and many high upland villages have experienced a continuous fall in population, as have the summit villages and others unfavourably placed. This was the case in England where many tides of settlement washed over the uplands, receded, and left overlapping cultural deposits. But in Wales and Cornwall and in parts of the Welsh border there has been far greater continuity of occupation and culture than in England.[1] Thus throughout the Bronze Age, burial customs of the megalithic period continued in use in Wales, and long after the hill fort had been abandoned in England it was inhabited in Wales [2] (*e.g.* Tre'r Ceiri, Caernarvonshire). So the pattern of certain prehistoric distributions in Wales seems to be preserved in the map of hill villages, notably in the case of camps with inturned entrances and (in western Wales) of megalithic monuments.[3] In the Welsh border and in Devon, the English tide washed far up into the strongholds of Welsh culture as is reflected in many features of settlement geography and notably in the distribution of place-name elements.

The new settlements made after the fifth century were rarely defensive, at any rate in south-east England; hence they did not seek the steep, isolated, and commanding sites favoured by earlier communities. If this contention is true, as there seems little reason to doubt, it explains both the location and distribution of the plateau, spring line, and elevated lowland villages. Some of these villages may be of ancient foundation but in most cases it is doubtful whether they pre-date the Anglo-Saxon settlement phase and whether they were ever anything more than peaceful agricultural communities.

In this connection the place-name evidence is of the greatest value. In the names of hill villages, British or Welsh place-name elements are common in Wales and the western counties and occur occasionally elsewhere. In England Anglo-Saxon forms predominate but the earlier elements *ing* and *ham* occur with relative infrequency (*ing* 66 times and *ham* only 44 times) while the *ton* ending, which may be assumed to indicate the later expansion phase rather than the early Anglo-Saxon settlement, occurs 235 times among the English hill villages, that is in almost a quarter of the total number (Figs. 4 and 5). This gives every support to the assumption that the Saxons carried out much secondary settlement in the uplands between river valleys after the main valley tracts had been colonized. Other areas of late Saxon and medieval settlement were

[1] "Continuity and persistence are remarkable features of the life of Wales as revealed by Archaeology": H. J. Fleure in *Arch. Camb.*, 1932, p. 241.

[2] Fox, *op. cit.*, p. 36.

[3] See the map of Megalithic Monuments in Britain by Miss L. F. Chitty and Sir C. Fox in Fox, *op. cit.*, p. 10.

Figure 4

Figure 5

the more heavily forested regions and in these too some of the late settlements were elevated. Sir Cyril Fox's maps of finds of the Anglo-Saxon pagan period compared with the settlements mentioned in Domesday Book illustrate this perfectly for the Cambridge region.[1] Professor Wooldridge, using place-name evidence to date the settlements of south-east England, notes that the Wessex chalk areas, the western end of the South Downs, the Sussex levels, the Rother, Thames, and Lea valleys, and the Vales of Oxford and Aylesbury appear as settlement areas of the expansion phase, and when that expansion was under way only the beginnings of settlement were apparent in the central Weald, the Bagshot country, the Chiltern Plateau, and the Middlesex and Hertfordshire uplands where later "topographical" name endings such as *ley*, *den*, and *field* are found.[2] These late topographical names were given also to many hill settlements; and still later (*i.e.* medieval and post-medieval) forms such as *Green*, *Hill*, and *Top* are common in regions where woodland persisted late, as in Worcestershire. *Leigh* and *hurst* occur 25 and 9 times respectively in the names of hill villages (Fig. 6). They are found only south-east of a line from the head of the Severn estuary to the south-west corner of the Wash and principally in Devon and the Weald, just as Scandinavian names are mainly north-west of this line.

The varied racial and cultural affinities and origins of hill villages are made clear on the place-name maps in Figs. 4–7. Place-name evidence establishes the fact that hill villages were associated with early British, Anglo-Saxon, Scandinavian, and medieval English settlement. Whether the Danes originated hill villages is more doubtful but that they adopted and settled them is clear from the fact that the ending *by* occurs 39 times in the names of hill villages (Fig. 7), mainly within the area of the ancient Danelaw. *Toft* occurs only twice, *thorpe* only five times, but there are numerous other Scandinavian and Scandinavianized names.

The Mediterranean tradition of building hill towns and villages is well known, but the occupation of hill sites for defensive reasons is encountered in widely separated regions and cultures far beyond the Mediterranean Basin. Fortified hill villages are still occupied by the inhabitants of the Aures Massif of Algeria, side by side with others recently abandoned.[3] In New Zealand the hill forts of the native Maori have been deserted only within the period of white occupation of the islands, which has thus witnessed that process of abandonment of hill camps postulated for Britain many centuries previously.[4]

The initiation of new rural settlements in Britain since the Norman Conquest has been limited in extent and generally secondary in character. On the other hand, the high moorlands have been virtually deserted by communities depending on agriculture, though long established communities on firm islands within marsh have persisted and have usually drained and cultivated the surrounding fen. In limited areas, the Scandinavians established summer settlements or *saeters* on hillsides, but these have added few to the present number of

[1] Sir C. Fox, 'Archaeology of the Cambridge region,' Map 5, p. 80.

[2] S. W. Wooldridge, "The Anglo-Saxon settlement," in H. C. Darby (ed.), 'The historical geography of England and Wales before 1900,' pp. 129–132, Cambridge, 1936.

[3] M. W. Hilton-Simpson, "Algerian hill forts of today," *Antiquity* 1 (1927) 389–401.

[4] Raymond Firth, "Maori hill forts," *Antiquity* 1 (1927) 66–78.

Figure 6

Figure 7

hill settlements. The remaining and generally the denser woodlands were gradually invaded by settlers in Norman and later medieval times and the characteristic manorial settlement typified by the lord's house and park, by a small "estate" village (or none at all) and in some cases by a small number of scattered farmhouses is sometimes found on hill as well as lowland sites where the woodlands, such as Wyre Forest and the Weald, were late in being settled. In Elizabethan and later times the squatting type of settlement, with its unmistakable pattern of poor cottages and small irregular holdings, appeared on the edge of unenclosed land and therefore often on the edge of woodland, high moorland, and low heath. Some became fairly compact hamlets; others were strung out as fringing settlements like Oreton Common and Clee Hill, Shropshire; while other late hamlets originated at moorland crossroads, typically round an inn.

Finally, hill sites less difficult of approach have been occupied for reasons very far removed from military requirements. Stone, flint, a variety of minerals and especially of metalliferous ores and coal have at various times drawn men to the hills though, in occupying them for the exploitation of their mineral wealth, they have often selected sheltered valley-head sites. Where such sites were not available or suffered from some disadvantage such as inaccessibility, the occupation of true hill sites resulted. From the eighteenth century onwards, there arose numerous villages on plateaux and hillsides associated with mining and quarrying. The close groups of villages on the northern side of Snowdon, those near Wrexham, and some in Cornwall owe their origins to mineral exploitation.

From the foregoing it seems that hill villages can be distinguished as survival types and normal types, the two not infrequently fused in a single village. In the first are included principally the summit types and others occupying a commanding position and approached by steep gradients. It is believed that these are mainly survivals from former ages when defence was necessary to almost every community especially in certain strategic regions. From time to time, as the need lapsed, the hill forts were deserted and were only occasionally reoccupied and rebuilt, for instance in Romano-British times. When pacification took place, as was usually the case after the Anglo-Saxon invasion phase except in areas affected by Scandinavian and later Norman inroads, the more inhospitable hill forts were finally deserted and only those within or near the upper limits of agriculture remained in permanent occupation. By the eleventh century some of these had become important road centres, markets, and administrative centres and some included old sacred sites, already perhaps occupied by churches which were religious centres for a large area. In others, land holding rights were jealously kept or tradition and love of the soil were particularly strong. Thus the old defensive basis of settlement was replaced and the church, in many cases, became the principal focus of the village, providing one of the stronger reasons for survival. Nevertheless, apart from a very small number of these hill villages, decline gradually set in until they became picturesque but backward survivals remote and isolated from the main flow of social and economic life.

Hill villages of the normal type form a much higher proportion of the total. Some belong in part to each group, for example the marsh island villages, and

no exact division is possible. But the normal type suffers from fewer drawbacks and locally displays many advantages for agriculture and settlement. Thus, of the elevated lowland and plateau villages, many are better placed for both arable and pasture land than their neighbours on the lowlands which in some areas are ill-drained and liable to flood. The water supply difficulty has generally been solved by settling on limestone or sandstone, the principal water-bearing rocks. In Devon, plateau villages occupy the best sites available over a wide area, but elsewhere, as in the Scarplands, the upland sites were less desirable and therefore hill settlement only followed the main early Anglo-Saxon occupation of the richer lowlands and wider valleys. Place-name evidence strongly supports the belief that much of this type of settlement was undertaken in the expansion phase of the Anglo-Saxon colonization. Nevertheless, it was sufficiently early to be associated with a true village community. Still later settlement was forced into the remaining areas of dense woodland and, when it was of Norman or later medieval origin, consisted of scattered or hamlet groups, not of true village communities. Lesser settlements also sought the hills sometimes, notably transhumant groups of Welsh or Norse and later squatting groups from many growing village communities situated near the edge of woodland, heath or high moorland, and eventually bleak quarrying and mining settlements were added to the number.

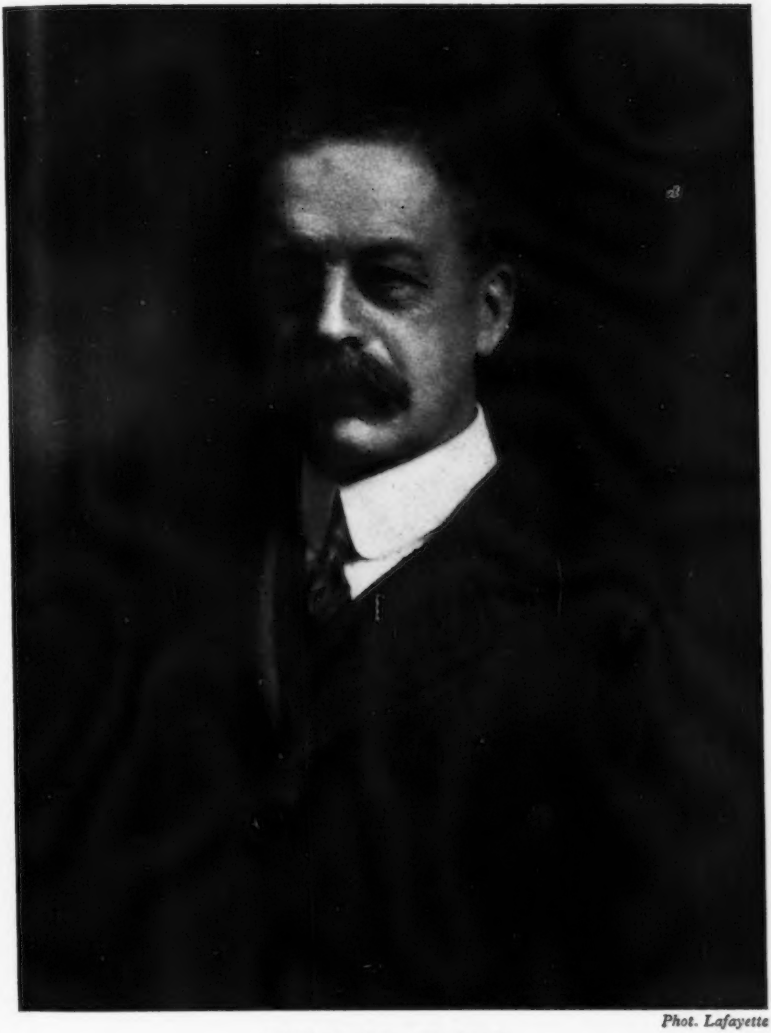
No clear regional divisions can be made on the map of hill villages, for villages of most of the principal functional and site types are found in widely different areas. But in conclusion three points may perhaps be stressed. First, the villages tend to have a certain degree of regional character and some features are only found within definite regions, for example the Welsh hillside farm-group which is characteristic of Wales and the border. Secondly, continuity and survival are strong in Wales as indicated by the comparison of this with earlier distributions. Although survival types are very numerous in England, the position in this country is far more complex than in Wales, for periods of origin and types of settlement vary much more widely, and no single key can be found to their distribution. Thirdly, the recent centuries of internal peace have brought rural communities down from the greater heights and, with few exceptions, the hill villages lie within the agricultural zone of altitude which in Britain is below 1000 feet.

THE RIGHT HONOURABLE SIR HALFORD J. MACKINDER, P.C., 1861–1947

On 6 March 1947, the Royal Geographical Society lost an outstanding figure of international repute. Halford John Mackinder, the eldest son of Draper Mackinder, M.D., was born at Gainsborough, Lincolnshire, on 15 February 1861. As a boy he used to watch "the crest fronted wave" on the Trent known as the eagre, and this impressive sight aroused his curiosity in the physical processes of nature. He was brought up on the borders between the two counties of Lincolnshire and Nottinghamshire and he soon became interested in the topography of both these large units. His earliest memory of public affairs went back to the day in September 1870, when he had just begun to attend Gainsborough Grammar School and took home the news which he had learnt from a telegram on the post office door, that Napoleon III and his whole army had surrendered to the Prussians at Sedan. At the age of twelve he is said to have given a discourse on Australia, his father's comment being "delivery good, reception excellent." While he was still at Gainsborough Grammar School as a day-boy he read an account of Captain Cook's voyages in the public library and thus began his life-long interest in the history of travel.

He was sent to Epsom College in 1874, and his father intended him to become a doctor. He was still eagerly devouring books of travel when he was supposed to be learning Latin; on one occasion he was caned for drawing maps instead of writing Latin prose. He sat for scholarships at Oxford and was *proxime* in his first attempt at Exeter College. At Merton he was again *proxime* for a scholarship, but was offered an exhibition which he refused upon the advice of his schoolmaster. Finally, in 1880, Christ Church offered him a Junior Studentship in Physical Science of £100 for five years, which he accepted. He appears to have devoted his main attention to biology and became particularly interested in the distributional side of his subject. At his final examination in the Honour School of Natural Science in 1883 he wrote an answer on the geographical distribution of animals. He was awarded a first class; in the same year he was President of the Oxford Union Society. He had spoken in a debate at the Union during his first fortnight at Oxford when the Hon. G. N. Curzon was President. He proceeded to read modern history in one year and he tried to study it in the evolutionary spirit in which he had studied science. In his final examination in 1884 he obtained a second class in modern history; in the same year he was elected Burdett-Coutts Science Scholar.

Mackinder joined the Volunteers at Oxford and played *kriegspiel*, both tactical and strategic, at All Souls. He read for the Bar and was called at the Inner Temple in 1886. His main legal interests lay in the field of international law which he claimed to be the most geographical side of law. Thus his wide training in local topography, biology, history, law, and strategy led naturally to geography, a subject which was then almost completely ignored in the Universities and schools of Britain. J. Scott Keltie's famous "Report on geographical education," presented to the Council of R.G.S. in 1885 and printed in *Supplementary Papers*, I (1886) 439–594, shows how low was the standard of geographical teaching in this country and is still worth reading in order to appreciate the progress which has been made since that date. Mackinder's great achievement was to raise geography from the slough into which it had fallen.



Phot. Lafayette

Halford John Mackinder

In 1885 Mackinder began to play an energetic part in forwarding the Oxford University extension movement for adult education and continued to do so for many years; in all he gave over six hundred extension lectures. The Royal Geographical Society gave financial support to Oxford's extension lectures in geography and also presented the University with illustrations of physical phenomena for use at the lectures. Mackinder, who was a close friend of Michael Sadler, also a Christ Church man and Secretary of the Committee responsible for the extension lectures, lectured up and down the country, especially in the north and west of England, during the winters of 1885–86 and 1886–87. The subject of these lectures was "the new geography" and they soon aroused the attention of prominent members of the R.G.S. In the spring of 1886 Mackinder was asked by Henry Walter Bates, the famous author of 'The naturalist on the Amazons,' then Assistant Secretary of the Society, to call on him in Savile Row. It appeared that Francis Galton, one of the Honorary Secretaries of the Society, had heard of Mackinder's lectures and Bates asked Mackinder to write down what he meant by "the new geography." Galton had given a presidential address of extraordinary foresight to Section E of the British Association at Brighton as early as 1872, and was fully alive to the possible development of geography as a science. In response to this request, on 31 January 1887, Mackinder gave a remarkable lecture to the Society "on the scope and methods of geography" (*Proc. R.G.S.* 9 (1887) 141–74) which was followed by a lively discussion held a fortnight later, in which Francis Galton, Professor H. G. Seeley, James Bryce, and Douglas Freshfield all took part. Galton prophetically remarked that Mackinder was destined to leave his mark on geographical education. Mackinder was only twenty-five at the time of this meeting, and still a B.A. In later life he was fond of describing how a worthy Admiral, a member of Council, who sat in the front row, kept on muttering "damned cheek" throughout the lecture.

At this very time the R.G.S., largely under the influence of Douglas Freshfield, was strenuously urging Oxford and Cambridge to give geography some recognition and in February 1887, only a few weeks after Mackinder's paper had been read, Oxford decided to establish a Readership in Geography for five years with a salary of £300 to which the Society contributed £150 per annum. Oxford was first in the field, as Cambridge did not appoint a lecturer until 1888 and the lectureship was not converted into a readership until 1898. It was fortunate for Oxford and for British geography that a man of Mackinder's energy and originality was available and he was appointed to the readership soon after the post had been advertised. Mackinder used to say that Richard Hakluyt, the Elizabethan, also a Christ Church man, was the first Oxford Reader in Geography, and that he was only the second. Mackinder has described his first lecture given at Oxford in 1887, just sixty years ago. "There was an attendance of three, one being a Don, who told me that he knew the Geography of Switzerland because he had just read Baedeker through from cover to cover, and the other two being ladies who brought their knitting, which was not usual at lectures at that time" *Geogr. J.* 57 (1921) 378). Later a charge was made to those non-members of the University who attended his lectures. The knitters stayed away but he soon drew audiences of several hundreds from all the colleges. From the first his lectures on the historical aspects of geography were attended by larger numbers than those on physical geography. It has been stated that his were the only official University lectures at Oxford which regularly concluded with applause. A number of history dons used to pay him special fees to give private lectures to them and their pupils, in which he repeated his University lectures and answered questions. There was much prejudice against geography at Oxford in those

days, and Mackinder said that one of the objections raised was "that the study of maps by the young promoted strategical, that is to say militarist and imperialist ways of thinking." In the spring of 1892 he visited the United States and made enquiries as to geographical teaching at Harvard, Princeton, and John Hopkins University; he was particularly impressed by the work of Professor W. M. Davis at Harvard. Mackinder spoke to a gathering of 1000 teachers at Philadelphia.

In May 1893 Mackinder took the chair at a meeting held in Christ Church at the instigation of B. B. Dickinson, a Rugby House-master. Together they started a group called the Geographical Association with the object of improving the status and teaching of geography. They received considerable support from the R.G.S. and especially from Dr. H. R. Mill, then Librarian of the Society. The first annual meeting of the Association, held in 1894, was addressed by Mackinder on "geography as a training of the mind." The Association then had fifty members; to-day there are more than five thousand. B. B. Dickinson is rightly regarded as its founder, but the Association owes much to Mackinder who fostered its interests throughout his life.

Now that lectures on geography were being given regularly in the Universities, it was only natural that Mackinder's next step was to urge that a geographical institute be established in England. He realized that it was not enough merely to give lectures in a University. He was now firmly convinced that, in order to secure the serious study of geography in the schools of this country, it was essential that there should be an institute or building where teachers could be trained and from which they could receive a definite qualification. He pleaded this cause when President of Section E of the British Association at Ipswich in 1895 (*Geogr. J.* 6 (1895) 367–79). As a result of his efforts and with considerable financial support from the R.G.S. the School of Geography was established at Oxford in 1899, its first home being the upper floor of the Old Ashmolean Museum. The staff originally consisted of Mackinder, the first Director of the School, assisted by A. J. Herbertson, G. B. Grundy, and H. N. Dickson. The first examination for the University's Diploma in Geography was held in 1901. By 1915 Oxford had awarded Diplomas to seventy-seven and Certificates to eighty persons, and Mackinder's object of raising a body of qualified teachers was well under way, as other Universities had followed Oxford's lead.

Mackinder's work took him to Reading and London and in both places he furthered the teaching of geography, although much of his time was given to administration. The Oxford University extension movement had been particularly successful at Reading, and in 1892 Christ Church elected Mackinder to a Studentship and offered his services to the University Extension Association at Reading, "in the hope of giving system and completeness to the work of the Association." In the same year a college was opened at Reading by the Dean of Christ Church and Mackinder served as its Principal until 1903. This is not the place to detail his eleven years of pioneer work in building up the college which later became the University of Reading, and the story has been well told by Dr. W. M. Childs, Mackinder's successor at Reading, in 'Making a University' (1933). Mackinder's aim in the college was to unite the humane arts with scientific and technical instruction, an aim which he always applied to his own teaching of geography in particular. Dr. Childs in summarizing Mackinder's work at Reading says: "He was a talker, convincing and provocative. He had a way of blending dreams and hard sense, subtlety and simplicity, and he never seemed to know when he passed from the one to the other. He made some opponents as a leader in stark earnest is bound to do. He sometimes ploughed

ahead leaving a wake of troubled waters, and he certainly gave the rest of us plenty to think and talk about. Masterful, he yet made us his partners."

In 1898, when he was still working at both Oxford and Reading, Mackinder decided to make an expedition to East Africa "because at that time most people would have no use for a geographer who was not an adventurer and explorer." He spent the long vacation of 1898 climbing in the Alps and in the summer of 1899 he made the first ascent of Mount Kenya, a feat which is fully described in the *Geographical Journal* (15 (1900) 453–86). He was assisted by two Swiss guides, César Ollier and Joseph Brocherel who had been recommended to him by Freshfield. Mackinder gave a shorter but very graphic account of the ascent at the centenary celebrations of the Society in 1930 (*Geogr. J.* 76 (1930) 529–34).

In 1904 Mackinder was appointed to succeed Professor W. A. S. Hewins as the second Director of the London School of Economics and Political Science, a post which he held until 1908. He did not resign his Oxford readership until 1905. He had acted as part-time Reader in Geography in the University of London from 1900 and he continued to hold this post, which later became a professorship, until 1925 when he resigned. At the London School of Economics he was always proud of having started the refectory, an important institution in a non-residential college.

In the three Schools of Geography at Oxford, Reading, and London, not only did Mackinder build up the methods of teaching the subject by his own example but he also encouraged the work of promising younger men. It is important to remember that he was responsible for persuading Andrew J. Herbertson to move to Oxford. "One day," says Mackinder, "a rumour reached me that a young Scottish Geographer, Herbertson, a disciple of Patrick Geddes, on whom I had had my eye for my principal assistant, had been offered a professorship in New York, which he was about to accept. There and then I jumped into a train from Oxford to London, and there took the night express on to Edinburgh. In the morning I breakfasted with Bartholomew, the great cartographer, and finding that he had as high an opinion of Herbertson's geography as I had, I drove to Colinton where Herbertson had his home. After lunch, when we were both in favourable moods, I told him that he was not going to New York, but was coming to me at Oxford in the autumn—and he came." Herbertson succeeded Mackinder as Reader at Oxford in 1905. Mackinder had also encouraged H. N. Dickson, who assisted him as lecturer in physical geography at Oxford and who became Professor of Geography at Reading in 1906, while in London he inspired and helped many geographers, including L. Rodwell Jones, his successor in the London chair, and Dr. Hilda Ormsby.

Ever since his early days at the Oxford Union Mackinder had taken a lively interest in politics. In 1900 he had contested Warwick as a Liberal but was not elected. In 1909 he made another unsuccessful attempt to enter Parliament by way of Hawick Burghs, this time as a Liberal-Unionist. In the following year he was elected for the Camlachie division of Glasgow as a Unionist, and held his seat until 1922. Having entered the field of politics he gave his country service in many directions. He did not desert academic life entirely, and, while he gave his main attention to politics, he constantly applied his geographical knowledge to the handling of practical affairs. During the war of 1914–18 he was a member of the National War Savings Committee and was responsible for the idea of saving by stamps. He helped to recruit men for the Army by speeches in Scotland, while the voluntary system was still in force. He was British High Commissioner for South Russia in 1919–20, and was knighted on his return. He served as a member of Royal Commissions on Income Tax and on Awards to Inventors, both in 1919, and on Food Prices in 1925. He became Chairman of

the Imperial Shipping Committee in 1920 and held that post until 1945. In 1926 he became a Privy Councillor and also Chairman of the Imperial Economic Committee, a post which he held until 1931. In that year he was once more President of Section E of the British Association, this time at the centenary meeting in London, and gave an address on "the human habitat" (*Scot. Geogr. Mag.* 47 (1931) 321–35).

It is not possible to refer to all his writings in this notice and many of the more important will be found scattered in periodicals. It is to be hoped that a complete bibliography of all his work will be compiled. Probably he will be best remembered for his 'Britain and the British Seas,' published in 1902, which is one of the few classics of modern geographical literature. This volume was the first of a series on "the Regions of the World" edited by Mackinder, and it should be remembered that he as well as Herbertson was responsible for introducing the idea of regional geography into this country: the regional idea was implicit in Mackinder's first lecture to the R.G.S. in 1887. The book received a long review from H. R. Mill, who described it as "remarkably powerful" in the *Journal* (19 (1902) 489–95); it also had an eloquent notice in the *Manchester Guardian* from C. E. Montague entitled "the raising of geography from the dead." In 1903 Mackinder was awarded the silver medal of the Royal Scottish Geographical Society for his services to geographical science and education. In addition to various school text books, some of which ran through many editions, he published 'The Rhine, its valley and history' in 1908 and eight lectures on 'India' in 1910. More important than these was his 'Democratic ideals and reality,' which appeared in 1919 when Mackinder was engrossed in politics. This book was based on a lecture on "the geographical pivot of history," given to the Society in 1904 (*Geogr. J.* 23 (1904) 421–44). There is no doubt that this book, whose significance was not realized in England at the time, influenced General Haushofer in Germany. The story of the book's effect on the German school of Geopolitics is outlined in Dr. Hans Weigert's 'Generals and geographers' (1942). Mackinder's book was re-issued both in England and America during the second world war; its importance seems to have been more appreciated in America than in England. Much of Mackinder's writing was in advance of his time; it was always marked by originality of thought and expression and by brilliant generalizations. He invented the word "nodality" and he first gave vogue to the term "man-power" in its modern sense in an article in the *National Review* in 1905; during the last war he described Britain as a "moated aerodrome." In his later years he wrote several papers on the philosophy of geography, of which the most valuable is probably "the music of the spheres" (*Proc. R. Phil. Soc. Glasgow*, 63 (1936–38) 170–81).

As a lecturer he was outstanding. Sir Charles Grant Robertson, who has described Mackinder as "the creator of modern geography, particularly on the humanist side in the widest sense of that term," has said that Mackinder and Oliver Lodge were the two best lecturers he ever heard. Mackinder never used notes, but his lectures were closely reasoned and were usually illustrated by physical maps. "I used to lecture on them [the maps]," says Mackinder when describing his early years at Oxford, "quite as much with my hands (plastically) as my voice. Say Wales—a sweep of the flat hand to generalize the highland, and a run of the finger along the edge descending to the English Plain." In his books Mackinder also made much use of maps and diagrams on which only a few selected facts were shown, in order to make his points more effective. This method of teaching is now commonplace but Mackinder is largely responsible for introducing it into this country.

Mackinder was elected a Fellow of the Society in 1886 and maintained his

connection with it throughout his long life; he paid a visit to the Society's house as recently as the summer of 1946 and congratulated the new Secretary on the recent numbers of the *Journal*. He served on the Council from 1909 to 1912 and from 1928 to 1936, and was Vice-President from 1932 to 1936. In 1945, with the approval of His Majesty the King, he was awarded the Patron's Medal, the highest honour that it is in the power of the Society to bestow. At the age of eighty-four he made an impressive speech thanking the President for the honour conferred upon him (*Geogr. J.* 105 (1945) 230–2). In the previous year he had received the Charles P. Daly Medal from the American Geographical Society at the hands of Mr. John G. Winant, then the American ambassador in London (*Geogr. J.* 103 (1944) 131–3), on which occasion he made an interesting speech with reference to his influence on German politics.

Dr. T. G. Longstaff, in his obituary of Douglas Freshfield, discussed Freshfield's part in the movement for the recognition of geography by the Universities and explained how his advocacy led the Society to subsidize geographical teaching at Oxford and Cambridge. "This," says Dr. Longstaff, "cost our Society some £20,000; but there is now no University in Britain without a School of Geography. It is perhaps the greatest work we have accomplished, for exploration would have gone on somehow even had our Society never existed, but without these efforts of ours, which Freshfield fathered, it is improbable that Geography would even yet have become an Honours subject, with all that that implies in outlook and teaching and teachers" (*Geogr. J.* 83 (1934) 259). This is undoubtedly true, but it is also true that without the activities of a man of Mackinder's dynamic energy and forceful personality in the Universities themselves, the Society would not have achieved its "greatest work" in what is comparatively so short a time.

Mackinder died last March at his home in Dorset. He retained his vigour of mind until the end although handicapped by increasing deafness. In June 1946 he talked of writing three more books in the years that still remained to him. He will probably be regarded as the greatest of the band of men who fought and won for geography its rightful place in British education, but he himself was always the first to acknowledge the cooperation of many others in achieving that triumph, of Galton and Freshfield, of Scott Keltie, of Chisholm and Herbertson, and especially of his old friend H. R. Mill, happily still with us. Sir Halford Mackinder will be remembered as a pioneer, not only in the arts of teaching and writing geography but also in the establishment of the movement for adult education, in laying the foundations of the University of Reading, and in proving the worth of geographical thought in practical affairs.

E. W. GILBERT.

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A RUSSIAN EXPEDITION TO THE ANTARCTIC

THE VOYAGE OF CAPTAIN BELLINGSHAUSEN TO THE Antarctic Seas, 1819–1821. Translated from the Russian. Edited by FRANK DEBENHAM. (Hakluyt Society, Second series, 91, 92.) *London: Hakluyt Society*, 1945. 9×5½ *inches;* xxx+260 and 216 *pages; maps and illustrations.* £3 15*s*

IT HAS long been matter for regret among students of antarctic exploration that no full translation of Bellingshausen's account of his antarctic voyage—originally published, in Russian, as long ago as 1831—has been available for their use. Hitherto they have been limited either to the abstract of it by Professor Gravelius, published (in German) in 1902, or to the short but brilliant outline of the voyage which forms one of the most interesting chapters of Dr. H. R. Mill's 'Siege of the South Pole' (1905). This outstanding gap in antarctic literature has now been most thoroughly filled by the present work: translated by Professor Edward Bullough, edited by Professor Debenham, and published under the auspices of the Hakluyt Society.

In his very informative introduction, Professor Debenham provides satisfactory answers to two questions which have always presented themselves in connection with Bellingshausen's voyage. Why, in the first place, was it ever undertaken? Russia has never laid claim to any antarctic or sub-antarctic territories; nor has she ever, save on this unique occasion, displayed any interest in antarctic exploration. And secondly, bearing in mind the striking results of the voyage—Bellingshausen completely circumnavigated the antarctic regions, filled up all the gaps in Cook's track south of 60° S., and became the first explorer ever to discover land within the Antarctic Circle—how was it that its outcome received, apparently, little or no contemporary attention?

In dealing with the former question, Professor Debenham points to the gradual development of the Russian Navy under Catherine II, a development which took the British Navy for its pattern; and to the pioneer efforts of A. J. von Krusenstern, which resulted eventually in the adoption of a sea-route to the Russian possessions and "factories" in the Far East in place of the costly and painful overland route formerly traversed by wagons and pack-horses. Krusenstern's return from his circumnavigation of the world (1803–1806), the first ever performed by ships of the Russian Navy, heralded the gradual emergence of Russia, under the energetic leadership of the Czar Alexander I, as a world-power in the struggle against Napoleon; and with the advent of peace it was natural that Krusenstern's work should have been followed up by such official voyages of exploration as Kotzebue's (1815–1818) and the two simultaneous expeditions, one to the Antarctic and the other to the Arctic, which Alexander I, ably seconded by the Marquis de Traversey, his Minister of Marine, despatched in 1819.

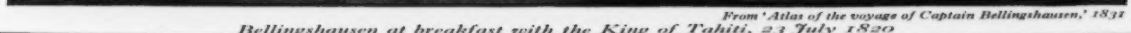
Of these, the command of the "first" or antarctic expedition fell to Captain (2nd Grade) Thaddeus Bellingshausen (Capt. Ratmanov, the officer originally selected, having withdrawn on the plea of ill-health). Bellingshausen, who had served as a lieutenant in Krusenstern's voyage, and was then engaged in the Black Sea survey, hurried to Kronstadt and assumed command of his little squadron—the sloop *Vostok* (East) and the transport *Mirnyi* (Peaceful), the latter under Lieutenant Mikhail Lazarev.

From 'Atlas of the voyage of Captain Bellingshausen,' 1831

Attempting to land at Moller Island (Amanu), 8 July 1820

From 'Atlas of the voyage of Captain Bellingshausen,' 1831

Bellingshausen at breakfast with the King of Tahiti, 23 July 1820



From 'Atlas of the voyage of Captain Bellingshausen,' 1831

Bellingshausen at breakfast with the King of Tahiti, 23 July 1820

Apart from the fact that his ships were both smaller and less robust than Cook's, as well as being notably ill-matched—the *Vostok* had to make most of the voyage under shortened sail to keep company with her dull-sailing consort—Bellingshausen's antarctic voyage was almost an exact replica, in outline, detail, and execution, of the voyage of his great predecessor, whose achievements and methods were regarded, by Krusenstern and other leading lights of Russian naval opinion, with a veneration amounting almost to fanaticism. In particular, his sanitary and anti-scorbutic measures were vigorously practised with great success, while the *Vostok* carried, as the *Resolution* had done fifty years earlier, an official astronomer and an artist. The third member of the scientific staff, a naturalist who should have joined at Copenhagen, withdrew at the last moment. It is interesting to note that, while visiting London in the course of vain efforts to find a substitute, Bellingshausen (with Lazarev as interpreter) paid a personal call upon the aged and famous Sir Joseph Banks, P.R.S., one of the very few men then living who had sailed with Cook during his first great voyage round the world.

The voyage was carried out exactly in accordance with the official Instructions, of which the long-suffering leader received no less than four separate sets from various official bodies. The *Vostok* and *Mirnyi* began by examining the south-west coast of South Georgia, which Cook had left uncharted, and resolved his "Sandwich Land" into a group of small, valueless islands, of which the northernmost three, named by Bellingshausen after the Marquis de Traversey (unfortunately contracted to "Traverse" on the present Admiralty charts), were new discoveries. Then they began an eastward circumnavigation of the Antarctic, keeping as far southward as practicable. In the course of this, they covered 242° of longitude south of 60° S., of which 41° were within the Antarctic Circle (against Cook's 125° and 24° respectively). The circuit occupied two seasons, the intervening winter being spent in visiting Port Jackson and surveying the Low Archipelago, then almost unexplored.

As Professor Debenham points out, there is little doubt that on more than one occasion during the first season Bellingshausen, like Cook before him, was actually in sight of the glaciated coast of the Antarctic Continent itself without recognizing its true nature, taking it to be an agglomeration of massive ice. During the second season however, Bellingshausen's untiring efforts were fittingly rewarded by his discovery, first, of Peter Island (68° 49′ S., 90° 32′ W.), and soon after of what he took to be a stretch of continental coastline (now Alexander I Island). Before "closing his circuit," he visited the South Shetlands, of whose discovery he had heard from the Russian consul at Port Jackson, and made an excellent running survey of the group. Here too, he fell in with some British and American sealers, and had that short interview with Capt. N. B. Palmer of which such ridiculously exaggerated versions have appeared of recent years in various American publications.

The *Vostok* and *Mirnyi* anchored off Kronstadt, in their original billets, on 24 July 1821 (O.S.), after an absence of 751 days. Of these, as Bellingshausen remarks with justifiable pride, 527 had been spent under sail, and during that period the squadron had covered upwards of 57,000 miles—more than twice round the Equator.

With their return, an "Iron Curtain"—to use the present-day phrase—descended for very many years upon all but the barest outline of their doings. Bellingshausen's official narrative of the voyage—in two volumes, accompanied by an atlas of charts and coloured lithographs—duly appeared in 1831; but it then attracted little attention, and did not find a translator. For this, as Professor Debenham suggests, its leisurely publication was no doubt partly

responsible. At the time of the expedition's return, ten years earlier, public interest in the Antarctic had been greatly stimulated by William Smith's discovery of the South Shetlands and their immediate exploitation by sealers of several nations; and it is significant that the only English book then dealing with this region—Weddell's 'Voyage towards the South Pole' (1825), a work inferior to Bellingshausen's in several respects—went into a second, enlarged edition within two years of publication. But by 1831 the antarctic fur-seal had been practically exterminated; and interest in polar matters had concentrated chiefly on the work of Parry and Franklin in the North West Passage region. Furthermore, Bellingshausen's work was liable to the objection that, in the main, its results were chiefly confirmatory of Cook's and, like Cook's, were largely negative. The temperate, fertile, populous "Great Southern Continent," so firmly believed in by eighteenth-century geographers, had been shown not to exist; while the existence of the real Antarctic Continent of to-day was, as yet, hardly more than suspected.

Bellingshausen's story of his great voyage will probably find more readers to-day, in its English guise and with its charts admirably reduced and transliterated, than it could have done at any earlier date. The translation is clear and faithful, while enriched by notes into which the editor has infused much of his wide antarctic experience. The whole work is a production with which its "onlie begetter," Professor Debenham, and his colleagues, have good reason to be extremely well satisfied. R. T. GOULD.

THE ECONOMIC GEOGRAPHY OF A WEST AFRICAN COLONY

THE NATIVE ECONOMIES OF NIGERIA: being the first volume of a study of the economics of a tropical dependency. By DARYLL FORDE and RICHENDA SCOTT. Edited by MARGERY PERHAM. (Published under the auspices of Nuffield College.) *London: Faber and Faber*, 1946. 9×5½ *inches;* xxiv+312 *pages; endpaper maps.* 25*s*

THIS WORK is the first of two volumes of a study dealing with the economics of a tropical dependency, prepared by a strong team of Nuffield College research workers under the general editorship of Miss Margery Perham. It is divided into two parts: the first, "The rural economies," is by Professor Daryll Forde, and the second, "Production for trade," by Dr. Richenda Scott. Volume 2, not yet published, will consider mining, commerce, and finance in Nigeria, and will also contain conclusions and bibliographies relevant to the present volume.

'The native economies of Nigeria' is a most valuable addition to the scanty serious literature concerned with British tropical colonies. Professor Forde, who is responsible for two-thirds of the volume, analyses the rural economies of Nigeria from a geographical as well as from a purely sociological point of view, and the value of the study is undoubtedly enhanced by the geographical technique that he has applied both in his field investigations and in the working-up of his material. Though there is an economic bias throughout the book, as is to be expected from its nature and intention, the volume probably contains more valuable material for the student of geography than any other single volume in English dealing with a West African colony. This applies equally to the section by Dr. Scott, who has made one of the few attempts to analyse the economic background of the production of West African export crops. If some sections of her contribution are less adequate and complete, the fault lies not in the author's treatment but in the lack of factual data and field studies without which intensive investigation is impossible.

The special value of Professor Forde's work derives from his intimate knowledge of some districts in Nigeria, and from his frequent use of material collected during the war by Dr. M. Fortes and of memoranda by officials of the Nigerian Government, most of which have unfortunately not been published and would, in fact, probably never have become known outside Nigeria but for the production of this volume. By comparison, Dr. Scott's contribution suffers, perhaps because it is primarily an analysis of published reports and statistics and because fewer field studies have been made of the economics of export crops. It is a significant commentary on the attitude towards colonial affairs prevalent during the last thirty or forty years, that at a time when the resources of colonial governments have, by common consent, been excessively devoted to the encouragement of the production of export crops, there should have been virtually no attempt to study objectively the facts behind production. Dr. Scott's chapters fill some at least of the gaps in our factual knowledge of Nigeria's export crops, but they also emphasize the urgent need for intensive field studies. These were impossible during the war, but now that conditions for field-work are easier, it is to be hoped that some of the Colonial Research Fellows appointed will be social anthropologists, economists, and geographers who will undertake such detailed investigations. One might also plead that colonial governments should not only

encourage their officers to make such studies, but should facilitate their publication so as to reach students in this country and elsewhere, who are at present starved for first-hand and authoritative accounts of colonial conditions.

Nigeria is a huge country—six and a half times the size of England and Wales—with about twenty-two million inhabitants, and it is therefore impossible to cover the whole area except by taking selected examples in different geographical regions. But most of its problems are typical of those of backward tropical economies, especially in Africa, so that the conclusions of these studies are of wide application; this was one of several reasons for the Nuffield College colonial sub-committee choosing Nigeria as the territory to be studied. Professor Forde has picked his types of rural economy with the greatest care. After stressing the importance of social factors, "the aptitudes, habits, and sentiments of the people, which set limits to the character and direction of both technological advance and economic organisation," he sketches briefly the leading features of the native economies. He lays particular emphasis on the importance of subsistence production, which he takes as the main basis for a fourfold classification of rural economy: that of the southern farmer, who produces root crops for subsistence and tree crops for exchange; that of the northern grain farmer with guinea corn and millets for food, and field crops for export; that of the farmers on the plateau, where inferior grains are grown and where exchange production is only poorly developed; and that of the northern pastoralists who rear cattle to provide them with milk, and sell livestock and their products.

Southern economies are then dealt with in detail. To show the diversity that underlies their superficial uniformity, four samples are taken. First, Professor Forde draws on his own field studies among the Yakur people of Umor, a Cross river village, to present an economy based on self-sufficiency in food and other household supplies, with production of oil-palm products for export. No other section of the book can rival this study in comprehension and authority: it sets a standard which cannot be maintained for those districts where no such detailed and expert studies exist. Two Ibo communities are then described, differing from the Yakur mainly in their higher densities of population. The degree of density cannot be precisely assessed, nor is it known exactly how great an area has more than one thousand persons to the square mile. It may well be less than has been suggested, and the condition may prove to be only the result of a maldistribution of population in relation to land and other resources. But the fact of congestion is undoubted and shows itself in soil exhaustion and in a decline in the quality and quantity of the available food supplies. These are serious signs in a community with a poor agricultural technique and few alternative sources of income.

The last of the southern samples comes from the Yoruba country of the south-west, where subsistence production is the same as in the areas already described, but where contrasts arise because of a different division of labour between the sexes, the importance of various crafts, the scale of the social organization, the development of large towns, and, above all, the establishment of cocoa as a permanent cash crop. The economics of cocoa farming are discussed, and sample estimates of cocoa production are given in an appendix. The figures of these estimates look impressive and even convincing in print, with expenses given exactly in pounds, shillings, and pence, and labour estimates in precise numbers of man-days; but, as with other tables in the volume, they need very cautious handling, since, as anyone familiar with illiterate communities is fully aware, the margin of error for such estimates may be very great indeed.

The chapter on the south concludes with a consideration of ways and means by which the productivity and efficiency of farming may be increased, and land

and labour used more economically—by green manuring, mixed farming, better methods of oil-palm exploitation, and redistribution of population in the more congested areas.

Northern Nigeria is dominated by the Hausa and by Islam, and everywhere direct production for household subsistence remains the basis of the economy. Geographical differences account for marked contrasts between the agricultural crops and systems of the north and south, and also for considerable differentiation between the various regions of the north in the cash crops produced mainly for export. Special attention is given to certain areas, including the zone of intensive farming surrounding Kano for a distance of 25 or 30 miles and those districts producing groundnuts and cotton.

Other northern economies are discussed in three groups. Consideration is first given to the "middle belt," transitional in economic and social conditions between north and south, and without the cash crops of either: the Nupe of the Bida emirate in the middle Niger valley, the Yoruba of Ilorin, and the Tiv (or Munshi) of the region south of the middle Benue are selected as examples. There follows an account of the "pagans" of the Bauchi plateau, which is of special interest to the geographer because of the peculiar physical conditions of the plateau and the development of tin mining in this previously isolated area. Lastly there is an account of the economy of the Fulani, numbering probably seven hundred thousand, of whom two-thirds still depend mainly on livestock for their livelihood. It is emphasized that however closely agriculture and livestock are integrated in the future through the development of mixed farming, there will be no early disappearance of the dominantly pastoral economy.

Professor Forde's last chapter is disappointing. The closely packed detail and careful analysis of the preceding two hundred pages lead one to anticipate more than a reiteration, in four pages, of what many officials and others have been saying for years on the social problems involved in the economic development of rural communities.

Dr. Scott concentrates her attention on three features of production for trade: vegetable oils, cocoa, and the livestock industry. Nigeria accounts for half the palm kernels entering world trade, a fair proportion of the palm oil, despite large internal consumption, and one-eighth of both the groundnuts and the cocoa; in each case, keen competition has to be faced from other producers or from alternative commodities, especially in the case of the oil-palm industry. Dr. Scott carefully describes existing conditions of production, assesses the degree of competition to be faced, and gives some indication of future prospects. The last chapter deals with the livestock industry, producing fresh meat, hides and skins, and dairy produce, for home consumption as well as for export. Here there has been considerable advance during the war, and there is every chance of further expansion given, as Dr. Scott puts it, "intelligent direction, vision, and courage on the part of the British authorities." It is because the situation in Nigeria, and indeed in all our colonies, demands these qualities of the authorities that it is to be hoped that this volume will be widely read, and that it will lead to wise and speedy action.

The volume opens with a concise outline of Nigerian political and economic development by Miss Perham, and a summary that from the geographer's point of view is all too brief of the country's physical character, communications, and people by Professor Forde. The usefulness of the book is maintained from this introduction right to the end cover where there are four folding-maps of Nigeria, one of which indicates the location of the groups and areas described in the text.

R. W. Steel.

REVIEWS

EUROPE

LAND CLASSIFICATION IN THE WEST MIDLAND REGION. A publication of the West Midland Group on Post-War Reconstruction and Planning. *London: Faber and Faber*, 1947. 11 × 8½ *inches; 48 pages; folding maps in end pocket, sketch-maps, and illustrations*

The publication of this interim report on the West Midland Region is opportune while various authorities are going ahead with their planning schemes. To have waited to publish reports as detailed as that for Herefordshire ('English County: a planning survey of Herefordshire,' 1946) would have resulted in too long a delay.

The book is mainly a statement of principles which must be taken into account in any new development plans. For such a large region comprising five counties (Staffordshire, Shropshire, Worcestershire, Warwickshire, and Herefordshire) some simplification was necessary in land classification. The factors chosen were two, namely site and soil, and much of the report discusses these. Each geological formation is summarized and each illustrated by a separate map in a most effective manner. These maps and others have one failing: no county boundaries are shown. It is hoped that in a revised edition this will be remedied. The map which does show county boundaries is all the more effective: a map of the Market Garden areas (p. 37).

The poorest map is that of the Drift Areas, but that is only to be expected since the whole region is not yet covered by Drift Editions of the one-inch geological maps; the map is therefore diagrammatic. The authors point out that from a land-use point of view the universal classification—boulder clay, sands, and gravel—is totally inadequate since soils on Chalky Boulder Clay are quite different from those on boulder clays derived, say, from the Trias.

Photographs of type areas are included but it is a pity they are concerned only with the Herefordshire region. The distribution of land in the Group's three categories is discussed and summarized with maps. Some of the facts are very revealing. In a pocket at the end are three maps on a scale of 1 inch to 4 miles. One is a coloured relief map, another a simplified geological map, and the third land classification based on the site and soil factors (this map does show county boundaries).

Planning authorities ought to study this book if only to remind themselves (though this ought not to be necessary) that land classification is an extremely intricate problem and that town planning is something more than a geometrical pattern imposed on the countryside. As Dr. R. E. Priestley aptly says in the foreword, "The function of town and country planning is to ensure the right use of the land." J. M.

THE BLACK COUNTRY. By WALTER ALLEN. (Vision of England series.) *London: Paul Elek*, 1947. 9 × 7 *inches; 48 pages; map and illustrations.* 9*s* 6*d*

In this Vision of England series most of the volumes are on individual counties, but the West Midland conurbation lying in three counties clearly deserves the separate treatment here accorded to it. Mr. Allen grew up in Birmingham so that he not only knows the area intimately but loves it as his native heath. The title is a little misleading since nearly a quarter of the book is devoted to Birmingham, though of course the author does not commit the common error of

including that city in the Black Country. There are quotations from most of the writers who have laid plots or staged incidents in the Black Country and the author's own descriptions are vivid and accurate (though Willenhall is not "a coal-mining centre," Halesowen has not "a large iron and steel industry," and Dudley Castle is not in Staffordshire). Indeed one could have wished for a volume twice this size, for some areas and aspects of the region get but scant treatment. It is a pity for example that Darlaston, the home of nuts and bolts, should get no mention at all; Coseley is also omitted. The author accepts without correction a statement from the *Encyclopedia Britannica* about the canals being "now mostly derelict" which is patently untrue; and in the reviewer's opinion he lays insufficient emphasis on canals and canal-side factories as fundamental features of the "cultural landscape." Also, the fireclay mines and refractory brick works which are special features of the south-western area—Brierley Hill and Stourbridge—are not described. And the reader may get an inadequate impression of the more modern features of the Black Country landscape, the new one-storey factories of steel, concrete, and corrugated sheet and the arterial road. But it would be churlish to criticize unduly, for churches, pubs, old houses, industrial history, and anecdotes, all have been packed in to make a readable volume of under fifty pages, while the rural surroundings, the playgrounds of the people, such as Clent and Lickey, Kinver Edge, and Sutton Park, are touched on as well.

There are many good photographs; those of the Black Country do not flatter this landscape of derelict land and smoking chimneys—but then it really is dismal for the greater part of the year and it is only in midsummer, for example during the blossoming of the rose-bay willow-herb, that it wears a colourful mantle. One is left guessing as to the titles of the two coloured plates.

The volume deserves a wide circulation both within and without the West Midlands; but it would attain this more easily if it were priced at ninepence instead of more than nine shillings. S. H. B.

LES RÉGIONS NATURELLES DE L'U.R.S.S. By Leo Berg. *Paris: Payot*, 1941. 9×5½ *inches;* 382 *pages; maps.* 12*s* 6*d*

In this volume the President of the Soviet Geographical Society presents a valuable account of some geographical aspects of the U.S.S.R. It is a translation of matter originally published as a series of regional monographs during the years preceding the war. The "natural" regions delimited are actually based on variations in natural vegetation. The first half of the book deals with eight lowland regions, the remainder with nine highland and three insular zones. Where the area is very large as is the lowland forest, or complex as that designated "Caucasus," there is considerable subdivision. Each chapter follows a similar pattern. Definition of the region is followed by descriptions of climate, relief, structure, soils, vegetation, and animal life. These topics are fully dealt with; human reactions are not considered.

Although to-day the economic and social aspects of Soviet geography bulk so large and receive most attention, there is real need for an objective, accurate study of the basic factors such as this. The facts are stated clearly and concisely. Where conflicting theories exist, as over the cause of the treeless steppe, the possible progressive desiccation of the deserts, or the origin of the special fauna and flora of Lake Baikal, the evidence is examined, the case well argued, and a conclusion reached. The contributions made by scientists of both the old and new régimes to exploration, investigation, or theory are acknowledged by name and date. There is no bibliography, probably because most of the original papers are in Russian.

Vivid descriptive writing is a marked feature of some passages. One recalls with pleasure the picture of the steppe between early spring and the parching heat of summer, changing in colour as short-lived florescent species in succession blossom and die; or of the conditions in parts of the tundra where "une carapace ininterrompue de glace" enfolds the landscape.

The emphasis in each region falls on the structure and the vegetation. Much useful detail is given on matters not generally known in this country. The climate usually receives adequate if less detailed treatment and illustrates the paucity of data from some regions. Two maps depict the vegetation regions in European Russia and in the U.S.S.R. as a whole. The inclusion of additional maps of smaller areas would have elucidated the text, especially in the descriptions of sub-divided regions. The absence of an index is a disadvantage.

Professor Berg has rendered a great service to geographers in all countries by this scientific account of the basic geographic conditions of the Soviet Union.

D. W. S.

OUR FORESTS. By W. H. Rowe. *London: Faber and Faber*, 1947. 9×5½ *inches; 173 pages; illustrations.* 12*s* 6*d*

The aim of this small book is primarily to explain to the uninitiated the great interest to be found in forests and in addition to state the fact that forestry is at the present time a matter of vital importance. It is becoming more generally recognized that the people of Britain have lost the forest sense which their forbears undeniably possessed.

The author, after a few words on "the magic of the forest"—"the peace of the forest" would be as applicable to-day—and on the forests of the past, devotes three chapters to the forester at work. As he says, most people in this country have only the vaguest idea of a forester's duties apart from the felling of trees. Most of the new public forests of Britain are as yet only in creation and there will be little mature tree felling in them for another forty years or so. The position was different before the war, and more so before 1914. There was then a considerable area of standing mature woods, conifers and hardwoods, in which tree fellings were undertaken.

Of the operations which the author designates "the birth of a forest" the public for the most part are in complete ignorance. For instance, how often has the question been asked of some young conifer plantation, "But why plant so many trees and so close together? When they grow bigger there won't be room for them all!" Apart from methods involving some form of natural regeneration, a crop of trees can sometimes be raised by direct sowing provided the ground is sufficiently clean and the operator knows the sylviculture of the species he is sowing and the locality factors. This is a fairly common method in parts of western Europe but is yet in its infancy in Britain. With us the new crop is normally established by planting young trees. In the past in many private forests no further attention was paid to the planted areas till they were old enough to have a first saleable thinning made in them. On smaller estates the plants were purchased from a commercial nursery. In the future it may be that these smaller estates will join together to pay for the services of a fully trained forester and maintain a general nursery to provide the plants: for it will always be cheapest to raise your own plants provided a sufficient annual output from the nursery can be used. In these chapters the author gives full details on the subject of seeds, cuttings, and nursery work generally; advice on what to plant and the reasons for the choice of species, and on whether to grow them in pure or mixed woods—that is, woods consisting of one species only or woods in which two species or more are mixed together; lastly the planting of the trees is dealt with.

Here again it has been a common misconception that having planted a young wood it could be left to look after itself. There never was a more mistaken idea. The very word sylviculture implies the care of the wood from the sowing of the seed to the felling of the trees. Afforestation, a word commonly used in Britain, is only the first stage of sylviculture. Thereafter unremitting work by a succession of foresters is needed if final success is to be achieved.

Subsequent chapters deal with Forest Enemies, Harvesting and financial considerations, Forest Trees (under Broad Leaved and Conifers), Timber and its uses, and a final chapter on "What of the future." Here the author states views which are by no means universally accepted. Perhaps the question is unanswerable at present. It is probable that a moderately dependable answer could only be given by those who have travelled widely, studying forests of many types growing in a variety or situations and enquiring into the needs of local populations; for it is the local populations who should always have first call upon the forests and lands in their vicinity. E. P. S.

ASIA

THE PEOPLES OF MALAYSIA. By FAY-COOPER COLE. *New York: D. van Nostrand*, 1945. (*London: Macmillan*, 1947.) $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xiv+354 *pages; maps and illustrations.* 22*s*

This work describes the physical characteristics, languages, and cultural affinities of the peoples of Malaysia, an area which includes the Philippines, Borneo, Bali, Java, Sumatra, and British Malaya. The need for an authoritative treatment of this subject in one volume has long been evident. Its author, Dr. Fay-Cooper Cole, is a distinguished American anthropologist who has for many years carried out extensive field work in this region. No attempt has been made to deal in detail with all the many and varied types of peoples in Malaysia. The treatment is essentially selective, for Dr. Fay-Cooper Cole has restricted his survey to those groups which best illustrate the varying degrees of culture and the results of contact with India, China, Europe, and America. With the exception of the pygmies of the Andaman Islands and the Balinese who are included for comparative purposes, all the peoples dealt with are those with whom the author has lived and worked.

After a brief archaeological survey and a review of historical developments, the most primitive of the cultural groups are described: these include the pygmies of the Andaman Islands, the Malay Peninsula, and the Philippines, and the Sakai and Jakun tribes of the Malay Peninsula. The salient physical characters of these peoples are noted and a full account is given of their ritual ceremonies and ways of life. It is pointed out that although the pygmies were most probably the first of the existing populations to reach Malaysia they have made little or no material advancement and have scarcely at all influenced the development of Malayan culture. A contrast is drawn between the Jakun, or pagan Malays, who inhabit much of the eastern and southern interior of the Peninsula and the Mohammedanized Malays whose ways of life can best be studied among the fishing settlements and rice farmers of the northern native states.

The longest chapter—over seventy pages—is devoted to a study of the peoples of the Philippines. Several pagan groups—the Ifugao, the Bontoc Igorot, and the Tinguian in Luzon, and the Bogobo in Mindanao—are described and their cultural development contrasted with the Mohammedanized Moro and with the Christianized Filipino. The pagan groups are especially interesting because they represent a northern extension of primitive Malayan culture. A vivid account is given of their religion, social structure, and economic activities. The

Ifugao are famed for their elaborate system of rice terraces which are amongst the most extensive in the world. It is suggested that the primitive Tinguians are descendants of the tribal groups who moved into the hills after the Spanish conquest of the Philippines. In the account of the Christianized Filipino, stress is laid on the influence of Spain and America and on the considerable Chinese intermixture.

Dr. Fay-Cooper Cole then passes on to a study of cultural groups in certain of the islands of the Dutch East Indies. The chapter on Borneo deals largely with the customs and activities of the Kayan people, one of the many pagan "Dyak" groups; their cultural affinities with other peoples of Malaysia are clearly demonstrated. There follows a short description of the Balinese whose culture is shown to represent a mingling of Indian and Malayan ideas: thus, whereas the Indian system of caste in a modified form has a marked influence on religious and everyday life, many of the ritual ceremonies, especially those connected with the rice harvest, are found elsewhere in Malaysia. The chapter on Java and its peoples is an excellent survey of life in the island and of the effects of culture contacts through the ages. There is an interesting account of Javanese agriculture and industry. The last three groups dealt with are the Menangkabau and the Batak of Sumatra and the peoples of the small island of Nias; each of these groups shows certain cultural features at variance with the fundamental Malayan pattern.

In a concluding chapter, Dr. Fay-Cooper Cole surveys the general characteristics of Malayan culture and its cultural affinities. There are appendices showing the distribution, physical types, and cultural traits of the various tribal groups. Some of the numbers on the tribal distribution maps are difficult to read. The appendices are followed by a selected bibliography which rather surprisingly omits to mention Mr. J. S. Furnivall's standard work 'Netherlands India,' first published by the Cambridge University Press in 1939. There are thirty-five illustrations and a useful index. J. C. S.

A TURKISH-ENGLISH DICTIONARY. By H. C. Hony, with the advice of Fahir Iz. *Oxford: Clarendon Press*, 1947. $9\frac{1}{2} \times 6\frac{1}{2}$ *inches;* viii + 397 *pages.* 25*s*

At last we have a really good Turkish-English dictionary, though perhaps only those brought up on Redhouse or even on Samy Bey can fully appreciate it. It bears one mark of efficiency on its face, in the acknowledgment of the help of a Turkish collaborator. Every language dictionary needs such collaboration. For lack of it two modern dictionaries—both published in Turkey and one sponsored by the Turkish Ministry of Education—have been spoiled: they contain many superfluities and even gross errors which English cooperation could have eliminated.

In his preface and introduction Mr. Hony passes lightly over the immense difficulty presented by the mass of words—as baffling to the Turkish public as to the lexicographer—which the purists have either coined or endowed with new meanings. Words used for centuries are banned by the purists overnight because of their Arabic or Persian origin; new words are introduced as suddenly with no apparent justification, though to the initiated they sometimes approximate to the French equivalents. Faced with the alternative risks of overloading his dictionary with ephemeral words or of omitting some terms destined to survive, Mr. Hony has made a judicious selection.

The magnitude and intricacy of the task of compiling this dictionary will hardly be suspected by the casual reader, who, even if he notices the benefit of having the stress and the long vowels marked, will not fully appreciate the proofs on every page that the compiler has always kept in view exactly what the user

will be wanting to find. As to the vocabulary: disputed neologisms apart, this dictionary seems to be as nearly comprehensive as any student could desire. Wherever tested by us it has produced the wanted word—and not words only, but idioms and proverbs in which this work is so unusually rich. Rendered into English with a directness and terseness suitable to the genius of the two languages, they can be read even by the layman with pleasure and profit; they throw much light on Turkish life and thought and illustrate richly that engaging Turkish quality—humour. Finally Mr. Hony has rendered a unique service by trying to dissipate Turkish haziness about birds and animals, flowers and trees, and to track down the exact English equivalents.

Type, layout, paper, and binding are what are expected of the Clarendon Press in times of plenty and seem a gift in these days of dearth. There are some misprints, but most of these are due to a confusion difficult to avoid, between the dotted and the undotted "i". They can be eliminated in the second edition which we confidently expect will be called for. It is hoped that the English-Turkish part, which we understand is in preparation, will not be long delayed. It should be invaluable to Turkish students of English. We have no doubt that the two parts together will establish themselves as the standard dictionary for the English and Turkish languages. R. W. B. and W. S. E.

ADEN TO THE HADHRAMAUT. By D. VAN DER MEULEN. *London: John Murray*, 1947. 9×6 *inches;* xvi+254 *pages; sketch-maps and illustrations.* 18*s*

This is an important book. Of recent years the Hadhramaut has become almost intimately known to thousands through the writings and pictures of Miss Freya Stark and the books of Mr. Philby and Mr. Ingrams; and even students of South Arabia have tended to forget that it was Mr. van der Meulen who, in 1931, was the first to enter and describe the mysterious valley of Hazarmaveth. His journey and his 'Hadhramaut, some of its mysteries unveiled' gave van der Meulen pride of place. The others followed: we see, as it were, their tracks in his snow.

In 1939 he attempted and succeeded in making another trip into the Hadhramaut, again accompanied by Professor von Wissmann. A great deal of their route lay through country never before traversed and described by Europeans, and it is the record of this journey, by pen and camera, that gives van der Meulen's new book its chief importance. The original manuscript was written in Dutch and the English version is excellent. Of particular interest to English readers are van der Meulen's observations on English colonial methods and the rôle of the Royal Air Force in the pacification of South Arabia.

It is fitting that a foreword should be contributed by Sir Bernard Reilly, who was Governor of Aden from 1937 to 1940, for it was he who initiated, guided, and encouraged all the good counsels and just works of which van der Meulen writes. The production of the book by John Murray, both as regards text and photographs, is an example for these austere days. S. P.

TIBETAN VENTURE. By ANDRÉ GUIBAUT; translated from the French by Lord Sudeley. *London: John Murray*, 1947. 6×9 *inches;* 206 *pages; illustrations.* 16*s*

This is an interesting and exciting account of a journey for which the author was awarded the Cuthbert Peek Grant by the Royal Geographical Society this year. The country visited was the unexplored area on the Chinese-Tibetan border inhabited by Ngolos, a race of robbers who are proverbial for their proficiency in this profession throughout Tibet. M. Guibaut was not successful in penetrating as far as he hoped into the Ngolo country, as his party was ambushed on a pass and his companion Louis Liotard and his Chinese servant were killed and all their property stolen. M. Guibaut himself with two of his servants, one of

whom had been wounded in the attack, were lucky to escape with their lives. Fortunately the notes and records of the explorers were subsequently recovered, enabling this book to be written. The author has named the pass on which the tragedy occurred "Liotard Pass" in memory of his companion; but it is doubtful whether the name can be accepted, as a pass of this kind must have a local name and the rules for naming such features are strict. But perhaps the authorities may make an exception in this case.

The two French explorers had together explored a stretch of the Salween in 1936–37 for which work they received several French geographical awards; but so far no account of the exploration described in this book has appeared, beyond short articles in technical journals in France and America and a short notice in the *Geographical Journal* in June 1938.

In the English translation it would have been better had the English system of transliteration from the Tibetan been adopted. The French method has been adhered to and this makes study of the journey and comparison with our English maps confusing. It takes quite a time to realize that "Tchrachy" is the very common Tibetan name "Trashi" (we sometimes drop the "r" which is only faintly sounded in Tibetan).

The map is good and it is a good idea to have it on tinted paper so that it is easily found. It will be known that the late Sir Eric Teichman travelled on the route described as far as Luho and the route followed by the French explorers up to this point is on the map which accompanies Teichman's 'Travels in eastern Tibet.' It was not Chao Eul-fong (anglicé Chao-Erh-Feng) who led the Chinese troops into Lhasa in 1910 as stated on p. 55. Chao at that time was Imperial Commissioner for Tibet and though, no doubt, he ordered the advance he did not accompany it. Chao's great cruelties on the Tibetan frontier, which are graphically described by Monsieur J. Bacot in 'Le Tibet revolté,' could hardly be considered as an attempt to "win over the natives by a system of gentle persuasion" as suggested by M. Guibaut.

The book concludes with an appendix giving valuable geographical notes which bring out a contrast, unique in such a small area, between the people of the bare plateaus and the wooded valleys. In other parts of Tibet this difference is not marked; some of the inhabitants take the herds up to the higher levels for grazing in summer but are not separated from their friends and relations who remain in the warmer valleys.

The English translation by Lord Sudeley is excellent. F. M. B.

CASTE IN INDIA: its nature, function and origins. By J. H. HUTTON. *Cambridge: University Press*, 1946. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* viii + 280 *pages; sketches.* 18*s*

The institution of caste in India is one of the most intriguing problems in the study of human society. It is moreover of urgent practical importance, both for India in its progress towards an occidental social democracy and for other "plural" societies showing analogous divisions into racial, religious, or economic sections. But the problem is overwhelming in its ramifications as the work of a host of scholars has shown. The caste system embraces nearly 400 million people. Its three thousand or so subdivisions are the result of a process that began probably a thousand years before the Christian era. Caste controls the intimate private life of the individual as powerfully as it regulates the political and economic relations of groups and the whole system of religion and law. Far from breaking down in the face of western civilization, it has assimilated most changes due to it. Such a system cannot be explained by a single formula.

The chief flaw in the work of most writers on caste (including Indian scholars)

has been over-emphasis on one factor or another, generally race, occupation, or religion. The facts of economics, history, archaeology, and ethnology, as Professor Hutton shows with telling documentation, prove that a great multiplicity of causes and conditions is involved. It is in trying to discover how these are all inter-related that Professor Hutton carries the study of caste a big step forward. He argues convincingly that caste in India is "a unique social system found nowhere else . . ." being due to "the interaction of . . . geographical, social, political, religious and economic factors not elsewhere found in conjunction." These include the geographical isolation and regional variation of India, deliberate administrative policies on the part of the Rigvedic invaders, and aboriginal totemistic and taboo concepts as well as more complex religious notions of alien origin. The system is the result of a long process of fusion of intrusive and indigenous ideas and principles of social organization. The key concepts in caste which are of a ritual rather than an economic nature—for example, the rules of commensality, pollution, and endogamy—derive from both sources. A point stressed by Professor Hutton, which in the reviewer's opinion is highly speculative, is the reaction of the patrilineal system of the invaders on the assumed basic matrilineal organization of the indigenous peoples.

But the outstanding contribution of this book to the understanding of caste is the analysis of the functions of caste. Having shown that caste is unique to India, Professor Hutton argues that it arose not by historical accident or political manoeuvre but as an "organic" adaptation by the society as a whole to special conditions of life. One of its main functions therefore is "to integrate Indian society, to weld into one community [its] various competing if not incompatible groups." This is apparent from its regional variability, its capacity to incorporate new groups, and its flexibility which allows inferior castes to work their way up. Caste is a "political stabilizer"; and though religious sanctions are important in maintaining the system it is ultimately a matter for the secular political authority.

'Caste in India' is a deceptively lucid book. For it is in fact a tightly packed analysis of the literature on the subject amplified by personal observations in many parts of India. Professor Hutton is known to Indian specialists for his 'Report on the Census of India, 1931' and for his writings on the Naga. The present book puts the general reader and the non-specialist student in his debt as well.

M. F.

CHINA. By NEVILLE WHYMANT. (Citizens of the World Series, 2.) *London: St. Botolph Publishing Co.*, 1946. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 121 pages; front endpaper sketch-map. 5s*

No less than 30 of the 116 pages of this short survey are allotted to a reprint of the latest draft Constitution and overlong verbatim reports of the Communist leader, Mao Tse-tung, and the National Government Minister of Information, Wang Shih-chieh (since become Foreign Minister). The best chapter is Chapter 2, on geography and agriculture. The writer finds the economic solution in industrialization.

The 35-page summary of Chinese history is entirely unsatisfactory. The attempts to draw analogies between the doings and sayings of ancient rulers and philosophers and our modern Nazis and Fascists show a lack of historical perspective. The author is almost certainly right in judging Shih Huang-ti to be really the First Emperor. (The legendary ones were at best patriarchal rulers of small communities of the type of Abraham and Melchizedek.) But the disparaging interpretations of the actions of the Emperor, who at any rate built the Great Wall, are crude. Nor does it help matters to align Hideyoshi with Tojo.

In his comments on the state of ignorance of the masses, which he attributes to the designs of "reactionaries," the author ignores the difficulties in the way of literacy caused by the Chinese script. Of course the scholars, like similar groups elsewhere, were prone to preserve the mystery of their craft but there were always openings for bright peasant lads to rise to the scholar class.

The assertion in the introduction that China has been the cultural mistress of Asia throughout recorded time is too sweeping. She did not invent Buddhism, while Hinduism with its caste system is quite alien to Chinese ideas. The account of Taoism, which has had so great an influence on the formation of Chinese character, is less than inadequate. But many will agree with the judgment (p. 26) that, "Except for brief flashes of insight . . . the Chinese have lacked political vision, and there has been no means of instilling it."

Against the rather sombre picture which emerges in spite of a desire, almost amounting to sentimentality, to make the best of things, is the riddle of the vast and continuous artistic output. In spite of limitations of space the author's enthusiasm does convey to the unsophisticated reader some comprehension of its scope and range. A. S. E.-S.

THE SOILS OF EQUATORIAL REGIONS, with special reference to the Netherlands East Indies. By PROFESSOR DR. E. C. JULIUS MOHR; translated by R. L. Pendleton. *Ann Arbor, Mich.: J. W. Edwards*, 1944. 11×8½ *inches; 766 pages; maps and illustrations.* £2 10s

The first part of Dr. Mohr's treatise was published in 1933 by the Colonial Institute of Amsterdam and the last in 1938. The translation was carried out by Dr. Pendleton in the Philippines and in Thailand and was completed in 1940. It was brought through the censors to U.S.A. in that year and the corrected edition was ready by the end of 1943. The book is one of the few books on tropical soils that has been written by an authority who has spent most of his life in the tropics. The subject matter is divided into two parts: the first deals with general matters and the second deals specifically with the soils of the Netherlands East Indies.

In the first part the main factors involved in soil formation are fully dealt with. In the first chapter a description is given of the chief kinds of parent rocks represented in the East Indies. In Chapter 2 the climatic agents of soil formation from rocks are fully discussed. This leads naturally to a consideration of the processes of weathering and soil genesis in Chapter 3, illustrated by reference to individual minerals and characteristic rocks. In this section the relationships between living organisms and soil formation are stressed and certain general topics are also discussed, for example, soil profile development, soil erosion, and the main kinds of soil as determined by the nature of the parent mineral materials.

In the second part of the book (five-sevenths of the whole) the soils of the different islands are considered in turn. More than half of the space is devoted to Java and Sumatra. The general treatment here is first to describe the rocks and the climate and then to deal with the incident weathering and the kinds of soils that result therefrom; finally the soil types are assessed and their agricultural utilization is indicated.

The first chapter on rocks contains numerous tables of bulk chemical analysis collected from various sources, but the discussion of factors such as structure which decide "weatherability" is perhaps inadequate as an introduction to soil formation. The second chapter on climate and soil development however presents much interesting and valuable new material, particularly concerning the classification of rainfall regimes, which clearly differentiates between rainfalls that are sufficiently intense to allow water to penetrate deeply into the mass of

weathered rock and those that are so light that the water evaporates without penetrating. Mohr thus distinguishes six categories of water movement affecting pervious and impervious parent soil materials of which two are upward movements affecting the ground water. The different regimes into which the rainfall of Java may be divided are indicated on a map based on records for 2492 stations. Unfortunately no corresponding maps showing the distribution of different kinds of parent materials or of mature soils accompany the rainfall map, so that the effectiveness of rain as a major soil-forming factor in Java cannot be gauged from the information given.

For the purpose of indicating and assessing the relative importance of the different soil-forming factors that have been involved in the genesis of any particular type of soil occurring in the Netherland East Indies, a complex system of notation has been worked out by Dr. Mohr in which letters and numbers are used as symbols to denote the nature of the parent rock, the zone of temperature, the direction of water movement, the degree of oxidation under which weathering has proceeded, and the stage of soil formation reached. This system is difficult to comprehend at first sight and it is doubtful whether it would be generally accepted by students. It is extensively used in the book for following the development of different soils from loose volcanic ash, but its general applicability to other parent rocks is doubtful without much more information from places outside the East Indies.

One serious drawback to Dr. Mohr's account of his development sequences is the sparseness of his analytical chemical data. Without this, many of the conclusions regarding the processes of soil formation must remain conjectural. In the final analysis, the identity and relative abundance of each component mineral, primary and secondary, occurring in each horizon of the soil profile must be known before the correct explanation of the soil's development and relationships can be completely formulated. Judging by the progress made in recent years in methods of identifying secondary clay minerals, it may be possible in the future to attain this ideal, but at present we must be content with the compilation of accurate detailed descriptions and with what laboratory data may be obtainable for such features as reaction, bulk chemical composition, degree of hydration, organic matter content, partial solubility in acids and alkalies and mechanical composition. Until much more is known about the actual composition, in terms of component minerals, of the multitudinous soil-types developed in various tropical countries, any attempt at soil classification must be merely tentative and limited in scope.

Dr. Mohr's book is a mine of information on tropical soils as they occur in the region where he studied them, and as such it will be repeatedly consulted by students and fellow workers. His theories and suggestions are helpful and stimulating and will doubtless be thoroughly tested by investigators in other countries. It is to be hoped that a thorough revision and amplification of the book may be attempted at some time in the near future, particularly of the first part which mainly concerns tropical soil formation. F. H.

PATRICK GEDDES IN INDIA. Edited by JACQUELINE TYRWHITT. *London: Lund, Humphreys*, 1947. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches; 103 pages; diagrams and illustrations.* 10*s*

Between 1915 and 1919 Patrick Geddes was commissioned to investigate a number of Indian cities and towns. Three-fourths of this volume is made up of extracts from his reports on the planning of those towns. These extracts were selected in the first place by H. V. Lanchester, who has written the preface (pp. 14–21), and edited by Miss Tyrwhitt in cooperation with Lanchester and

Arthur Geddes. There are also an illuminating and appreciative introduction (pp. 7–13) by Lewis Mumford, and a final section "Maharajah for a day" (pp. 96–101) quoted from Philip Boardman's biography of Patrick Geddes. Together these give a good indication of the ideas and methods for town planning which Geddes had developed after many years of study in biology and civics and a wide experience of social problems. He was planning for a living society in an actual geographical and social environment: not for any abstractions. All his work shows his distrust of preconceived formalism; and his suggested proposals for the improvement of particular urban environments for the society living there are of value to all planners.

Patrick Geddes was one of the most original and stimulating thinkers of the generation just past. Most of his very far-reaching influence on present thought arises from his personal contacts and teaching. His written work, though considerable in total volume, is widely scattered and much of it is almost inaccessible. May we hope that this volume is but a forerunner of 'The collected works of Patrick Geddes.' C. B. F.

AFRICA

THE NILE BASIN. VII. The future conservation of the Nile. By H. E. Hurst, R. P. Black, and Y. M. Simaika. (Physical Dept. Paper, No. 51.) *Cairo: Ministry of Public Works*, 1946. 11×7½ *inches;* xv+178 *pages; maps, diagrams, and illustrations.* 25*s*

The agriculture of Egypt and the Sudan depends upon irrigation, and the increasing population which can be supported is therefore linked with the conservation of the waters of the River Nile. 'The Nile basin,' Volume 7, deals in some detail with this problem and records the conclusions which have been reached as to the pattern of future development.

The solution reached involves an increase in the water storage capacity already available for regulating the flow throughout a given year as well as the creation of further storage to compensate for variation from year to year. Measures to limit evaporation losses are also proposed. An additional advantage gained would be the reduction of flooding. The following works are contemplated: first, a new main Nile reservoir between Atbara and Wadi Halfa for flood protection and summer storage; second, a reservoir in Lake Albert combined with a regulator on Lake Victoria for over-year storage; third, a diversion canal in the Sudd region to carry about half the flow occurring during the period February to July inclusive. This water at present overflows the banks of the Bahr el Jebel and heavy evaporation loss occurs in the swamps. The other half of the flow would be carried by the existing river bed but with much diminished loss. And fourth, a reservoir for over-year storage in Lake Tana is proposed.

It is significant that so far as over-year storage is concerned the scheme is wholly dependent upon external territories, Lake Victoria lying in Tanganyika and Uganda, Lake Albert in Uganda and the Belgian Congo, and Lake Tana in Abyssinia. The authors remark that further progress with the Tana scheme must await agreement with Abyssinia but that of the remaining territories appears to be taken for granted.

The book contains a good deal of technical information which is of considerable interest, including flow figures for the Nile and hydrographs for the years 1870 to 1945 inclusive as well as detailed discussions of the several schemes. In the case of over-year storage an attempt has been made to apply statistical methods of analysis but, as in most other rivers, the records available do not extend over a sufficiently long period. To meet this difficulty the correlation of as many as sixty other associated natural phenomena has been studied, including

river discharges, rainfall, temperature, and pressure at stations throughout the world. These are said to conform to the normal law of error. It is well known however (see Hazen, 'Flood flows') that river flows do not in general do so, there being almost always some degree of skew. In these circumstances the derivation of the empirical formula shown in Plate 12 does not inspire confidence.

H. D. M.

ETHIOPIA, the study of a polity, 1540–1935. By DAVID MATHEW. *London: Eyre and Spottiswoode*, 1947. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* x+254 *pages; endpaper maps and illustrations.* 15*s*

In this book, which is described as the study of a polity, Archbishop Mathew brings a scholarly mind to bear on the age-long Ethiopian dynasty, the Solomonic line as it is more often called. His stay in the country was not long enough to enable him to add an original contribution to the literature on the subject or to lift the narrative out of the complex mixture of history and tradition into which it has fallen. During the wholesale burning of the churches and libraries during the Muhammadan invasion under Muhammad Granye in the sixteenth century, old manuscripts of great value not only to the Ethiopians themselves but to all those interested in the history of the Christian Church were destroyed, leaving gaps in the historical record, some of which might nevertheless still be filled by one who could travel round the monasteries and could read the ancient documents in Geez.

The author enjoyed a short tour in the country and browsed among rare volumes to be found in the Legation libraries in Addis Ababa. This opportunity he shares with his readers by giving numerous extracts from the writings of the few travellers, missionaries, diplomats, and adventurers who, since the Middle Ages, succeeded in penetrating to the mysterious Christian enclave and who either left a record of what they saw or described their experiences for others to publish. Quotations are made from works by such well-known names as Alvarez, Lobo, Salt, Bruce, General Gordon, and the classics of Sir Wallis Budge, and the whole is composed into a consecutive and readable story. Although the period covered by the book begins with A.D. 1540, the year of the arrival of the Portuguese under Christophe de Gama, some perspective is lost by not mentioning the early expansion of the Christian kingdom under the Emperors Ella Asbeha and Gabra Maskal, A.D. 514 to 570, across the Red Sea into the Yemen and in the reign of David I to Zeila at the end of the fourteenth century.

The author seems to seek a solution of the problem how the succession of the kings has been maintained in a country surrounded as it has been by pagan and Muhammadan hostile nations, although he does not postulate a theory and there is no summing up. The evidence points to there being a dual reason, partly climatic (surrounding tribes from the hot lowlands, such as the Danakil and Dervishes, were able to invade but were unable to colonize the cold high plateaus on which the Ethiopians thrive) and partly the unity of Church and State. The Ethiopian Church does not itself proselytize and has always been extremely tolerant of other faiths, but only so long as no attempt is made by the apostolate of other creeds to interfere with the established Church of the country. The Emperors Za Dengel in 1603 and Susenyos in 1607 were both converted by Roman Catholic missionaries. The former was killed in a rebellion led by the priests and the other was compelled to abdicate. Lij Yasu in 1913 was deposed by the priesthood on account of his pro-Muhammadan tendencies. It was chiefly the support of the Church, given during the Italian occupation between 1936 and 1940, to the Emperor Haile Silassie and his patriots that

enabled them to stultify the Italian conquest and eventually by an added miracle of circumstance to restore once again the ancient dynasty.

The plate opposite p. 214 is stated to be an Abyssinian painting of the Battle of Adowa. This is unlikely, as there are two aeroplanes in the sky and the date of the Battle of Adowa is 1896. As Ras Gugsa is written in amharic over one of the central figures it is probably a painting of the defeat and death in battle against Central Government forces of Ras Gugsa Wolye, husband of the Empress Zauditu, in 1930. R. E. C.

CENTRAL AND SOUTH AMERICA

WELFARE AND PLANNING IN THE WEST INDIES. By T. S. Simey. *London: Oxford University Press*, 1946. 8½×5½ *inches;* xii+268 *pages.* 15*s*

In 1940 Sir Frank Stockdale was appointed Comptroller for Development and Welfare in the West Indies. For three years Professor T. S. Simey served on the staff of this new organization as Social Welfare Adviser, thus acquiring personal experience of the problems of the West Indies. This book is divided into seven chapters: an introductory chapter is followed by chapters on the origins and the organization of West Indian society. The economic foundations of life in the West Indies are then examined and two further chapters deal with the rebuilding of West Indian society and with social welfare schemes now in operation.

Professor Simey deems it unnecessary to give a description of the climate, topography, and economy of the West Indian colonies, but he lays emphasis on the fact that the islands cannot be treated as a geographical entity. He deplores the lack of the statistical evidence, which is so essential for the study of West Indian problems and for efficient government. In a recent article in the *Geographical Magazine* Professor Simey urged the need for a survey of the human geography of the West Indian colonies and he would not claim that his book has filled this particular want. Nevertheless, the book does give the clearest available account of the present social problems of the islands and is made more valuable by its comparisons with similar conditions in the United States and in Puerto Rico. The careful references to the numerous blue books and to other writings on the subject add to the value of the book. E. W. G.

VISION OF PERU: kings, conquerors, saints. By Violet Clifton. *London: Duckworth*, 1947. 8½×5½ *inches;* 358 *pages; map and illustrations.* 21*s*

Nothing of modern Peru appears in Mrs. Clifton's book, which is however readable and stimulating. It goes no farther than the sixteenth century and nearly half of the Vision is concerned with the myths and memorized history of the pre-Spanish Inca Empire. The second part gives some account of Pizarro's conquest with a long diversion on Pedro de Alvarado, conqueror of Guatemala. The last chapters deal with the lives of saintly persons of late sixteenth-century Lima, canonized a century later, among whom the half-negro Martin de Porres is perhaps the most sympathetic character.

The legendary chapters are based upon well-known authorities, with Garcilaso de la Vega much utilized. Unpleasant details of certain aspects of life and of native vices are emphasized, while less than justice is done to the art and superb technique of some regions and to the splendid architecture and agricultural science of others. I think the author has insufficiently noted the differences between the highlands and the coastal lowlands and the leavening fact that all accounts of pre-Spanish conditions were recorded either by Spaniards or by Spanish-educated, Christianized Peruvians. The Spanish *relación*, scrupulous as it generally was, naturally tended to become an apologia for the Conquest

and this view the author accepts, suggesting that the Conquerors had a "better law" to bring. That may be, but whatever the Spanish benefits conferred it is impossible not to regret the annihilation of a brilliant native culture. It is true that Spain was not alone in her attitude; the Pilgrim Fathers ousted the Red Man although firmly convinced that he was descended from the Lost Tribes.

Mrs. Clifton's style is attractive until it occasionally changes deliberately to a sort of rhapsodic preciosity or introduces, in order to make a suggestion, mystical "Voices" speaking of Atlantis, China, India, and so on. Time and thought have so evidently been given to the volume's preparation that the prevalence of errors is surprising. The proof-reading is slip-shod; for example Estremadura appears in three different forms and Lafone Quevedo's name is misspelt. Not only are common words misspelt but accents are omitted or scattered lavishly in the wrong places. The bibliography too needs revision; some books are listed twice in different forms, while other indispensable authorities are omitted. The author, by the way, may be assured that papaya fruit do not grow on palms; that there is no moth in Peru (or anywhere else) capable of injecting a "mortal stab of venom"; and that travellers in Peru need not fear to encounter "snakes that rattle, and sometimes run erect between the trees."

The line drawings are reproduced from Rivet's edition of Poma de Ayala, the sketch-map from a work by Roberto Levillier. L. E. J.

THE LAND DIVIDED: a history of the Panama Canal and other isthmian canal projects. By GERSTLE MACK. *New York: Alfred A. Knopf*, 1944. 9½×6½ *inches;* xvi+650+xxxv *pages; maps and illustrations.* $6.00

Of prime interest to the historian and economist perhaps, this book should be a welcome addition to any serious geographical library. It is a systematic and well documented history of the Panama Canal and other isthmian canal projects, written by an American architect for whom the subject came to have, by chance, an absorbing interest. It is a record of four centuries during which "men worked and schemed, fought and died to cut a passage through the American isthmus."

Part 1, entitled "The Spanish era," comprises ten chapters covering the period from the early discoveries to the achievement of independence by the Latin-American peoples. For an introduction, perhaps such topics as the exploits of Drake and Morgan are treated at excessive length, though they do not lack interest. Part 2, "The battle of the routes," is probably of greatest interest to the geographer, beginning as it does with the views of Humboldt, who suggested nine possible routes for a crossing of the Americas from the Peace River in the north to the Gulf of St. George in southern Chile. Mr. Mack details the various proposals which followed as the mounting tide of commerce pressed increasingly against the isthmian barrier. Proposals were advanced for various routes through the isthmuses of Panama and Nicaragua, and with the California gold rush came an intensified and expanded investigation of these routes, together with a number of new proposals. Plans were put forward for canal traverses through the isthmus of Tehuantepec; through the isthmus of Chiriqui; through the Darién isthmus; through the San Blas isthmus by means of tunnels; and *via* the Gulf of Urabá and the Rio Atrato. In nearly every case there were several variants of each projected route, each variant vehemently urged by its promoters.

Part 3, "The French era," covers a more familiar story, the unsuccessful attempt by Ferdinand de Lesseps to construct a sea-level canal across the isthmus of Panama (1880–90). Mr. Mack achieves a very fair statement of the engineering and financial complications attending this undertaking, and concludes, "The fundamental reason for the collapse was the company's—which means

de Lesseps's—insistence upon the adoption of a sea-level design . . . for a commercial company . . . it was a hopeless aspiration." Part 4, "The American era," deals with the history of the American achievement, in a clear account of tangled political issues and difficult problems of engineering and hygiene. The concluding chapters provide useful accounts of the system of charging tolls, of the traffic making the passage (1915–41), and of the discussions preceding the enlargement of the canal by a third set of locks, the construction of which was commenced in 1940.

Mr. Mack has produced a most useful and readable account. He avoids any narrowness of view in his treatment of such topics as the Panama Revolution (1903) or the controversy with Great Britain over the proposal to exempt from tolls American coastwise shipping (1912–14). The index is adequate and the bibliography copious. F. W. M.

PACIFIC

THE ISLANDS AND PEOPLES OF THE SOUTH SEAS AND THEIR cultures. By RAYMOND KENNEDY. (Jayne Memorial Lectures, delivered at the American Philosophical Society, March 1944.) *Philadelphia*, 1945. 10×6 *inches; 88 pages; map and illustrations*

This little book gives a concise geographical, historical, and sociological picture of the South Seas. It is clearly and informally written and tries to convey to the ordinary man some of the detachment and sense of values of the scientist. For example, in talking of racial types, Kennedy says: "The poor Melanesians are voted down almost unanimously by the whites as repulsively ugly in appearance. What have we here but a reflection of our own standards of beauty? Every race of man is narcissistic in this respect, believing its own type of face and body to be the apex of comeliness. The central African bushmen recoil in horror at the pasty skin and grotesquely long noses of white people, and we return the adverse judgment in our disapproval of their sooty skin, flat noses, kinky hair and thick lips." On education he also makes some pointed comment: "The people have caught a glimpse of what they consider to be a kind of magic in the educational process. And magic it is, but of a kind that the white masters are not entirely sure they like. It transforms populations of easygoing, easy-to-handle natives into ambitious, enterprising people like ourselves, who get ideas about self-government, better jobs, and higher wages." These two extracts show that although there is nothing very new in the book, the facts and problems are presented with grace and humour and uncomfortable issues not avoided.

The photographs are disappointing, perhaps because of very bad reproduction. R. M. F.

PHYSICAL GEOGRAPHY

LES PROFILS FLUVIATILES EN LONG, LEURS FORMES ET LEUR genèse. By P. S. JOVANOVIĆ. *Paris: Armand Colin*, 1940. $9\frac{1}{2}\times6\frac{1}{2}$ *inches;* x+196 *pages; diagrams*

Professor Jovanović here makes accessible to a wider public work of outstanding importance which he has already published in Serb in the volumes of the Geographical Society of Belgrade. Professor Jovanović sets out to compare precisely the long profiles of three Balkan rivers, the Vardar, the Morava, and the Timok, to understand the forces moulding their long profiles, to arrive at a general classification of the stages in the evolution of these profiles, and to verify the known principles of fluvial erosion. This he accomplishes in such a manner

as to open a new chapter in the history of river study and to challenge others to apply his methods in their own areas.

First he reduces the river profiles to the same length, and this involves a proportional reduction in heights. The X-axis is numbered from 0 at the mouth to 10 at the source, and a unit on the Y-axis represents 1/10000th of a unit on the X-axis or 1/10,000th of the length of the stream. Thus the height and length scales are different for each river, a sacrifice which Professor Jovanović makes in order to simplify his statistics and to enable an accurate comparison to be made of the stage of evolution of the long profiles. The extent of this sacrifice is evident when one considers the complication of plotting tributaries as well as the main stream. A tributary, whatever its length, has to be fitted between the junction and the 10 coordinate. Thus the scale of each tributary and of the main stream is different. Graphical comparisons though useful are not precise enough for this analysis, and so tables are compiled giving statistics of height, slope, etc., at the ten points on the profile and at critical intermediate positions.

The long profile is assumed to result from the interaction of five main factors: discharge, base level in relation to initial relief, geological structure, vegetation, and period of action. To disentangle these, it is first assumed that a single factor is responsible, and the long profile related to this factor alone is calculated. The departures of the resulting profile from the long profile are then attributed to the other factors.

Discharge is given first place. This must be determined at the 10 points and at breaks of slope. Gauge values must be used where they exist, and elsewhere discharge (Q) is computed from Pardé's formula $Q=\frac{S\,P\,C}{31557}$, where S is the surface area draining to the point in question, P is the average annual precipitation over that area, and C is the coefficient of run-off. C is first obtained for the gauge stations by using the corresponding values of Q, S, and P, and its value at other points is then found by interpolation.

The profile of equilibrium is taken to be that in which all the energy is used for flow; that is, the slope at every point is such that the velocity is just insufficient to carry fine clay particles. This limiting velocity is taken to be 0·1 m./sec., a value close to the mean of those of several authorities quoted. A formula giving the relationship between slope and discharge, and satisfying these requirements of velocity, is then looked for. After a careful examination of eight formulae, that of Kutter is chosen because it gives results approximating to the mean values of those given by the other formulae. In its general form, Kutter's formula is $I=\frac{v^3(m+\sqrt{\{p\sqrt{Q/v}\}})^2}{100^2p^2Q}$, where I is the slope, Q is the discharge, v is the velocity, m is the coefficient of viscosity, and p is the coefficient for the wetted perimeter. The appropriate values are substituted for v and m. The value substituted for p is that for a semi-circular section—a rather big assumption. The formula then becomes $I=\frac{10^{-6}\{0{\cdot}62783(1{\cdot}75+1{\cdot}1234\sqrt[4]{Q})^2\}}{Q}$, from which Professor Jovanović concludes that the form of the profile of equilibrium is a function of discharge.

Apart from the simplification of the cross-section in this formula, there is a more questionable assumption that v is a constant. The load which Professor Jovanović assumes the river to carry in its stage immediately preceding equilibrium must be picked up somewhere, and there the velocity according to Hjulstrom must be considerably greater than that necessary merely for transport. Perhaps the load comes from tributaries not near the stage of equilibrium.

With clay particles the velocity necessary for erosion is very substantially greater than that for transport owing to the cohesion of these fine particles. Furthermore, are we justified in assuming that all rocks weather down to a grade approximating to that of clay particles? Lastly, it is generally acknowledged that rivers modify their courses mainly in times of flood, but Professor Jovanović has taken mean annual precipitation as his index of discharge. If flood discharge were used one would have had more confidence in the results.

Having plotted the profile of equilibrium and the long profile for a given stream, Professor Jovanović measures the area included between the two profiles to get "l'indice moyen de hauteur." Using this value as a coefficient, he determines the profile of discharge. This profile is related only to discharge but is at a stage in its evolution corresponding with that of the ordinary long profile. This method does not seem to have been applied to the profile given of the upper Morava, because at one point the profile of discharge almost coincides with the profile of equilibrium although, in the main, the former profile is far above the latter.

In the three rivers selected for study the curve is a fair approximation to the long profile, and this confirms Professor Jovanović in his belief that discharge is the prime factor in moulding a river's long profile. The departures of the long profile from the profile of discharge indicate the action of other agencies, first among which is geological structure. This is next singled out for analysis.

The average river gradient across each rock type is taken as the index of hardness, and the profile of discharge is then corrected accordingly. This gives "le profil de conformité." The second set of departures of the long profile from this profile reflects influences other than those of discharge and rock type.

Much ingenuity has been applied in thus estimating the influence of rock type on the long profile, and no doubt further refinements will result from its application to other rivers. This method would probably be vitiated with many rivers where the hard rocks outcrop only along the steeper parts near the source. But the three Balkan rivers were well chosen, for in most instances the same rock type outcrops at several parts of the rivers' courses.

Such statistical methods can only be relied on when a very great number of results are analysed. In a country with a first-class geological survey, these methods could be applied to many different rivers so as to eliminate disturbing factors such as nick points. Fairly reliable estimates could then be made of the influence of the different rock types on river profiles.

In this illuminating analysis one misses adequate reference to calibre of material and its influence on river gradient. This omission may be justified for the profile of equilibrium but not for "le profil de conformité." Professor Jovanović would argue that any such missing factor should show up in the second set of departures. Many eminent hydraulic engineers, including Schoklitsch, Sternberg, Putzinger, and Shulits, go so far as to claim that load calibre largely determines the curve of water erosion. It is a pity that Professor Jovanović did not pay more attention to this factor which has been found important for the Rhine, Maas, Ems, and other well-studied rivers.

The second set of departures is related to initial relief (not the absolute height above base level, for which some allowance has already been made, but variability of relief), to subsequent tectonic movement, and to changes of climate. There is a short discussion of the influence of faults, folds, tilts, and changes of sea-level on the long profile, followed by an admittedly theoretical discussion of the influence of a change of discharge due to a change of climate.

A last curve—the profile of approximate equilibrium—is obtained which allows both for discharge and rock type. It is derived from the profile of con-

formity by dividing the heights by the index of average slope (less 10 per cent.) of the group of softest rocks.

Professor Jovanović derives several new conclusions about river erosion from this analysis. They can be summarized as follows: First, river erosion depends on (i) local conditions of slope, discharge, cross-sectional area, rock type, etc., which produce "l'érosion immédiate," (ii) the evolution of slopes downstream, which produces "l'érosion régressive," (iii) the quantity of material eroded upstream which, by decreasing "l'érosion immédiate" and "l'érosion régressive," determines the true erosion of "l'érosion conforme." Second, the erosion of each section depends on that of all the others. Third, in the evolution of the initial profile, there is first a tendency for all slopes to approach the slope of equilibrium and so produce "le profil de conformité"; this adjustment is preserved throughout its evolution, that is, heights diminish in proportion to the height of the corresponding points on the profile of equilibrium. Fourth, base level is the profile of equilibrium, not sea-level. Fifth, "l'énergie érosive cinétique" at any point is represented by the difference between the actual slope and the slope of equilibrium for that point, increased by the influence of slopes downstream and decreased by the influence of transport. Sixth, "l'énergie érosive potentielle" at any point is represented by the height of the long profile above the profile of equilibrium. Seventh, erosion at any point is proportional to "l'énergie érosive cinétique." Eighth, the evolution of the form of the profile is proportional to "l'énergie érosive potentielle." Ninth, stage of evolution of the profile corresponds with the depth of the profile below the initial relief, where this can be determined.

The work finishes with a brief comment on the application of this method of analysis to the study of terraces.

One of the more important of the above conclusions is that all slopes become reduced gradually without receding upstream, in spite of the reference to "l'érosion régressive." If I understand Professor Jovanović aright, his thesis stands or falls by this one criterion, and I, for one, would hesitate to base a theory on the assumption that steep slopes do not recede upstream. But even if certain of Professor Jovanović's methods and conclusions are eventually modified, this work will remain an outstanding contribution to river morphology. The scope and manner of his analysis go far beyond anything that, to my knowledge, has yet been accomplished in this major field of study. With right use it should enable long profiles to be analysed without recourse to empirical formulae, but with the aid of formulae based directly on the forces and reactions involved in river flow. W. V. L.

GEOPHYSICAL EXPLORATION. By C. A. HEILAND. *New York: Prentice Hall*, 1946. 9×6 *inches;* xiii+1013 *pages; diagrams and illustrations*

In the course of its development the study of geophysics has advanced in two distinct directions. In the first instance the physics of the earth was investigated for its own sake or for the direct assistance which it could give to human activities (such as the use of the earth's magnetic field as an aid to navigation); but later observations were used increasingly as a source of information on the form and structure of the earth itself. Geophysical exploration, in which the physical experiments are planned entirely for their bearing on a geological problem, is the purest product of the latter line of development, while the study of natural earthquakes may be considered to hold an intermediate position.

Heiland however defines his subject as "the application of the principles of geophysical science to [commercial] problems of smaller geologic scale," so that the scope of the book is generally limited to the theory and practice of short-

range field investigations. The first six chapters contain an elementary survey of the subject for the benefit of "individuals in executive and geologic advisory capacity." Practically all the information in these chapters is repeated in greater detail in the main part of the book and their purpose could have been served more effectively by a separate publication.

The rest of the work is essentially a handbook for prospecting engineers and covers the techniques of gravitational, magnetic, seismic, and electrical prospecting in considerable detail. Each of these chapters follows a uniform scheme, starting with a fairly general theoretical discussion, followed by tables giving values of the relevant rock properties and a description of the methods by which these properties can be investigated in the laboratory. Then follows an account of field apparatus and prospecting technique, leading to a discussion, illustrated by examples from areas of known geology, of the methods of interpreting the results. Of the last two chapters in the book, the first deals with geophysical well-logging while the second covers an assortment of topics ranging from echo sounding to radioactive soil testing.

Generally speaking, the descriptions of numerous variants of apparatus and technique tend to err on the side of uncritical generosity. The nineteen different sorts of gravimeter and the twenty-nine seismographs can scarcely fulfil forty-eight distinguishable functions, and one feels the need for a fuller discussion of the factors which would enable an operator to chose the best type of instrument for a given purpose.

On the theoretical side, the restrictions imposed by the author's definition of his subject are applied rather inconsistently, and it is surprising to find the principle of isostasy dismissed in a single paragraph (on the ground that anomalies produced by commercially valuable formations are too localized to be affected by isostatic reduction) when the same chapter contains a substantial section on the international gravity formula and its geodetic application. Moreover, while there is practically no discussion of the main magnetic field of the earth, a number of purely physical topics are included when they might well have been left to the standard textbooks; and there seems to be no justification for the inclusion of greatly simplified diagrams of radio receivers and valve amplifiers.

The book is copiously illustrated and, although the quality of production falls short of the best American standards, it is strongly bound and reasonably light to handle. The prospector who intends to use established methods will find it a sound and practical work of reference, but it is less helpful to those who are seeking to extend geophysical methods into new fields or who are interested in the more fundamental geological problems. P. L. W.

ECONOMIC AND HISTORICAL GEOGRAPHY

РУССКИЕ ОТКРЫТИЯ В ТИХОМ ОКЕАНЕ И СЕВЕРНОЙ АМЕРИКЕ В XVIII–XIX ВЕКАХ. (Russian Discoveries in the Pacific Ocean and North America in the eighteenth and nineteenth centuries). Edited by A. I. ANDREEV. *Moscow, Leningrad: Academy of Sciences*, 1944. 7½×5 *inches; 224 pages; illustrations*

In Siberia, as in North America, political considerations played a very small part in directing pioneer exploration and settlement. In both continents the fur traders were the dominant agents of expansion and in Siberia their eastward march was remarkably rapid. Crossing the Urals in 1581 the Cossack fur traders reached the Pacific in 1638. In 1648 a Cossack trader, Semen Deshnev, sailed from the mouth of the Kolyma River through the straits later named the Bering Straits. In 1732, during a Russian military expedition against the primitive

tribe of the Chukchi, the second mate, Ivan Fedorov, and the geodesist, Michael Gvosdev, crossed the Bering Straits to the "Great Land" later named "Russian America" and later still "Alaska." But it was only as the result of the disastrous second expedition of Vitus Bering in 1741–43 that Alaska was opened up to the Russian traders. The enormous quantity of valuable furs brought back by the survivors of this expedition attracted fur traders in the same way as the stories about Eldorado attracted gold seekers. So the first "sea voyage" was organized by the merchant Serebrennikov in 1743 and it marked the beginning of the advance of the "fur belt" from Siberia to America. A succession of traders in roughly built ships began to penetrate farther and farther along the stepping-stones of the Aleutian Islands in search of sea-otters, blue foxes, seals, and other peltry. In 1776 an Irkutsk merchant, Grigori Shelekhov, built his first large vessel for the fur trade and in 1780, in collaboration with the brothers Golikov, he founded a trading company which in 1798 was reorganized under the name "Russian-American Company" and was granted by the Russian Imperial Government exclusive monopoly and administrative rights in the American territory. Under the able directorship of Alexander Baranov (1790–1818), the company greatly prospered and gradually moved its principal trading post from the Isle of Kodiak to Sitka with outlying posts (for example Fort Ross) extending into California almost as far south as San Francisco. The history of the Russian-American Company is vividly related in a recently published book, 'Lord of Alaska. Baranov and the Russian adventure' by Hector Chevigny (reviewed *Geogr. J.* 107 (1946) 254). The book ends with an extensive bibliography relating to the Russian exploration and exploitation of Alaska, but apparently there were still a large number of unpublished documents in the Russian archives bearing on the subject. Some of these have now been published by the Russian (All-Union) Geographical Society under the editorship of A. I. Andreev. These documents fall into three groups: (1) those relating to the expeditions of the Russian traders to the Aleutian Islands in 1758–64; (2) those relating to the activity of the Shelekhov-Golikov company in 1785–90, and (3) a travel diary of the clerk of the Russian-American Company, N. I. Korobyzin, 1795–1807.

The first set of documents is not extensive but it contains a description of numerous newly discovered islands in the groups Near Islands, Rat Islands, Andreanov Islands, and Fox Islands. The interest of these unpretentious reports written by rough traders lies in the minute descriptions of the native population, fauna, and flora of these hitherto unexplored islands. Of particular interest is the detailed description of the primitive tribes of the Aleuts, their dress, weapons, hunting methods, and customs.

The second group of documents comprises various instructions and reports by G. I. Shelekhov, including reports to the Irkutsk Governor-Generals, I. V. Jakobi and I. A. Pil, and a petition to the Empress Catherine II. These documents are interesting as showing clearly the attempts made by Shelekhov to establish friendly relations with the natives and his anxiety to secure a permanent foothold in America with the government guaranteeing his company the necessary monopolies and protection against other Russian and foreign traders.

The memoirs of N. I. Korobyzin, clerk of the Russian-American Company, provide a vivid account of the activities of the company in Siberia and of Korobyzin's voyage round the world with Kruzenstern and Lisiansky. Two ships of the Russian navy, the *Nadezhda* under the command of I. F. Kruzenstern and the *Neva* under the command of Y. F. Lisiansky, were ordered by the Russian government to sail to Alaska. They were to take as passengers N. P. Resanov, the ambassador designate to Japan, and his suite: (the attempt to open up diplomatic relations with Japan however proved unsuccessful). The two

ships left Kronstadt harbour on 26 July 1803 and, after calls in Denmark and England, proceeded to the Pacific Ocean *via* Cape Horn. In the Pacific they visited a number of islands, including Easter Island, the Marquesas, and the Sandwich Islands. The notes made by Korobyzin on the inhabitants of these islands, their dress, weapons, and habits are most interesting. It is also worth noticing the deep influence exercised by the methods of Captain Cook both in the organization of the voyage and in the dealings with the natives. On arrival at the island of Kodiak, headquarters of the Russian-American Company, the ship *Neva* (*Nadezhda* having sailed for Japan) discharged her cargo and almost immediately after was involved in a military expedition organized by Baranov for the retaking of Sitka from the warlike tribe of the Thlingit ("Kolosh" as they were called by the Russians). The return to Russia was made westward *via* Canton, where the cargo of furs from Alaska was sold and Chinese merchandise shipped; then by the Cape of Good Hope and the Atlantic, arriving in Kronstadt on 23 July 1806. The memoirs of Korobyzin, full of minute observations, are a valuable addition to the previously published accounts of this voyage, the first Russian circumnavigation of the globe. S. I. T.

LES PAYS TROPICAUX: principes d'une géographie humaine et économique. By PIERRE GOUROU. (Colonies et empires, Première serie: Études Coloniales, 3.) *Paris: Presses Universitaires de France*, 1947. 9×5½ *inches;* viii+200 *pages; sketch-map.* 180*fr*

Professor Gourou's useful study is of much topical interest. After a geographical analysis of the tropical regions, he discusses methods of raising the standard of life of their inhabitants and their place in the future world economy. Contrary to the lingering tradition of their wealth and luxuriance, he shows that in reality natural resources are not vast and that their development is fraught with many difficulties. The shifting agriculture, practised particularly in Africa, is carefully adjusted to conditions of climate and soil but requires so large an area to support a unit of population that there is no prospect of increasing the density. The sparse population in turn prevents the endemic diseases from being effectively controlled and the maintenance of necessary social services.

The author knows Indo-China intimately and has written two standard works on its human geography. This is part of the one tropical region, with a few special exceptions, which maintains a dense population with a long-established civilization, based upon the wet cultivation of rice and on tree crops. He believes that the application of this system offers the best prospect for tropical regions elsewhere, and that recent proposals to introduce mixed farming with stock raising on the Western European model into West Africa are unsound. Industrialization on a sufficiently large scale to affect the population density is in his opinion improbable, though there are local industries capable of expansion. Modern industries could be set up only at heavy cost behind high tariff barriers, and attempts at self-sufficiency would isolate the regions, whereas their hope of prosperity lies in integration into world economy. In the densely settled tropical regions there is the further difficulty to be overcome that higher production will result in a greater population with the same standard of living. He also stresses the danger of reliance upon a single crop, which through technical or other reasons may cease to maintain itself in the world market.

This small but stimulating book, which takes account of recent work in this field, can be warmly recommended. G. R. C.

ADDITIONS TO THE LIBRARY AND MAP ROOM

EUROPE

BRITAIN AND HER EXPORT TRADE

By M. Abrams. $8\frac{1}{2} \times 5\frac{1}{2}$. 330 pp. *London: Pilot Press*, 1946. 15*s*

BRITISH REGIONAL GEOLOGY: NORTHERN ENGLAND. (*Geol. Survey*)

By T. Eastwood. 2nd ed. $9\frac{1}{2} \times 6$. 68 pp. Maps and diagrams. *London: H.M.S.O.*, 1946. 2*s* 6*d*

THE SEVERE WINTER OF 1946 TO 1947

By C. K. M. Douglas. (*Meteor. Mag.* 76 (1947) 51–6; illustrations)

MAJOR CLUES IN THE TECTONIC HISTORY OF THE MALVERNS

By N. L. Falcon. (*Geol. Mag.* 84 (1947) 229–40)

THE GEOLOGY OF OXFORD

By W. J. Arkell. $9\frac{1}{2} \times 6\frac{1}{2}$. viii + 268 pp. Maps and illustrations. *Oxford: Clarendon Press* (*Lond., Cumberlege*), 1947. 20*s*

LAND UTILISATION IN THE BELFAST AREA

By D. A. Hill. (*Geography*, 32 (1947) 20–33; maps)

UNGLACIATED AREAS IN SOUTHERN IRELAND

By A. Farrington. (*Irish Geogr.* 1 (1947) 89–97)

IN THE KINGDOM OF KERRY

By Richard Hayward. 9×6. 350 pp. Illustrations. *Dundalk: Dundalgan Press*, 1946. 17*s* 6*d*

JAKUBIANY

By M. Lukniš. (*Sbornik, Sc. Faculty Slovene Univ., Bratislava*, vol. 14.) 9×6. 66 pp. Maps and illustrations. *Bratislava*, 1946 (English summary)

An account of the environment and life of the largest sheep-raising centre in Slovakia

SLOPE AND DUNE VEGETATION OF NORTH JUTLAND. I. Himmerland

By T. W. Böcher and others. (*Biolog. Skr., K. Danske Vidensk. Selskab.* 4 (1946) No. 3, 78 pp.; illustrations)

HISTOIRE GÉOLOGIQUE DU SOL FRANÇAIS

By Léon Bertrand. 2 vols. $7\frac{1}{2} \times 5$. 364; 370 pp. Maps and diagrams. *Paris: Flammarion*, 1944, 1946

Volume I deals with materials and structural types; volume II with the evolution of the geological regions

THE NEW ITALY

By Muriel Grindrod. $8\frac{1}{2} \times 5\frac{1}{2}$. x + 118 pp. *London: R. Inst. Internat. Affairs*, 1947. 5*s*

A clear narrative of events in Italy since 1940, including chapters on political developments, the economic situation, and the Peace Treaty

LA VÉNÉTIE JULIENNE, ÉTUDE DE GÉOGRAPHIE POLITIQUE

By M. Le Lannou. (*Ann. de Géogr.* 56 (1947) 13–35; sketch-maps and illustrations)

THE GEOGRAPHICAL DISTRIBUTION IN NORWAY OF CERTAIN INDICES OF HUMIDITY AND OCEANITY

By C. L. Godske. (*Bergens Museums Årbok*, No. 8 (1944) 26 pp.; maps)

RUSSIA AND THE RUSSIANS

By Edward Crankshaw. $7\frac{1}{2} \times 5$. 256 pp. *London: Macmillan*, 1947. 9*s* 6*d*

The author, who has considerable first-hand knowledge of Russia, interprets its development in relation to environment and history, and explains the divergences between Soviet and western European ideas

SWITZERLAND REVISITED

By Charles Graves. $8\frac{1}{2} \times 5\frac{1}{2}$. 224 pp. Illustrations. *London: Geoffrey Bles*, 1947. 15*s*

STUDIEN ZUR GEOMORPHOGENESE DER SÜDALPEN ZWISCHEN ST. GOTTHARD UND ALPENRAND

By Hans Annaheim. (*Geogr. Helvetica*, 1 (1946) 65–149; sketch-maps and illustrations)

SWEDISH LIFE AND LANDSCAPE

By E. A. Hille. $8\frac{1}{2} \times 5$. 150 pp. Illustrations. *London: Paul Elek*, 1947. 12*s* 6*d*

An agreeably written and candid description of most aspects of Swedish life, with good illustrations

LA DENSITÉ DE LA POPULATION RURALE EN CARINTHIE

By S. Ilešič. (*Geogr. Vestnik, Ljubljana*, 18 (1946) 22–35.) [Slovene: French summary]

ASIA

A GUIDE TO 14 ASIATIC LANGUAGES

By Andrew Boyd. 7½×5. x+262 pp. *London: Pilot Press*, 1947. 9s 6d

Lists of words, transliterated into Roman characters, with grammatical notes for the construction of simple sentences

THE CLIMATIC PROVINCES OF CHINA

By A. Lu. (*J. Geogr. Soc. China*, 12–13 (1945–46) 15–24)

ON REGIONALISM IN CHINA

By J. E. Spencer. (*Journ. of Geogr.* 46 (1947) 123–36)

LAND UTILISATION IN TSUNGYI DISTRICT, KWEICHOW

By M. N. Jen and others. (*J. Geogr. Soc. China* (*Nanking*), 12–13 (1945–46) 1–14; sketch-maps)

NGOLO-SETAS: 2me Expedition Guibaut-Liotard au Tibet

By André Guibaut. 8½×6. 228 pp. Maps and illustrations. *Paris: J. Susse*, 1947.

The English translation of this book is reviewed at p. 111.

THE FOREIGN TRADE OF INDIA, 1900–1940; a statistical analysis

By H. Venkatasubbiah. 8½×5½. 84 pp. Diagrams. *Bombay: Oxford U.P.* (*for Indian Council of World Affairs*), 1946. 7s 6d

ROADS AND ROAD TRANSPORT IN INDIA

By Sir Kenneth Mitchell. (*J. R. Soc. Arts*, 95 (1947) 592–610)

THE MAGADHAS IN ANCIENT INDIA

By B. C. Law. (*R. Asiatic Soc. Monogr.* 24 (1946) 50 pp.; map)

THE TREND OF THE GROWTH OF POPULATION IN THE UNITED PROVINCES

By R. L. Singh. (*Bull. Nat. Geogr. Soc. India, Benares*, No. 3 (1947) 17–29)

TOUR DIARIES OF THE SPECIAL OFFICER, SUBANSIRI, 1944–45

By C. von Fürer-Haimendorf. 13×8. 138 pp. Map. *Hyderabad*, 1945

Records of journeys by an anthropologist in the little-known eastern portion of Balipara, North-East Frontier

LES TERRASSES D'ABRASION MARINE DE LA CÔTE LIBANAISE

By E. de Vaumas. (*Bull. Soc. R. Géogr. Egypte*, 22 (1947) 21–35)

AFRICA

DESERT HAWK: Abd el Kader and the French conquest of Algeria

By Wilfred Blunt. 8½×5½. 292 pp. Illustrations. *London: Methuen*, 1947. 16s

THE ORIGIN OF THE SUDAN GEZIRA CLAY PLAIN

By J. D. Tothill. (*Sudan Notes and Record*, 27 (1946) 153–83)

THE BANGWEULU SWAMPS OF CENTRAL AFRICA

By F. Debenham. (*Geogr. Rev.* 37 (1947) 351–68; illustrations)

THE EAST AFRICAN GROUND NUTS SCHEME

By Frank Samuel. (*African Affairs*, 46 (1947) 135–45)

MISSION SCIENT. DU FEZZAN, 1944–45. Mémoires. Vol. III. Géographie humaine

By J. Despois. 9½×6½. 268 pp. Maps and illustrations. *Algiers: Inst. de Recherches Sahariennes*, 1946

IL PROBLEMA DELLA LIBIA

By S. R. Prina. (*Continenti* (*Rome*), 2 (1947) 9–15)

WIND IN THE SAHARA

By R. V. C. Bodley. 8½×5½. 278 pp. *London: Robert Hale*, 1947. 12s 6d

INDUSTRIAL DEVELOPMENT IN THE UNION OF SOUTH AFRICA IN RELATION TO WATER RESOURCES

By F. E. Kanthack. (from *Ann. Proc. Assocn. Sc. Societies, S. Africa*, 1946–47. 18 pp.)

THE DEVELOPMENT OF THE VAAL RIVER AND ITS DEPOSITS

By H. B. S. Cooke. (*Trans. and P. Geol. Soc. S. Africa*, 49 (1946) 243–62; maps and illustrations)

NOTES ON THE DISTRIBUTION AND DENSITY OF POPULATION IN CAPE TOWN, 1936

By E. Batson. (*Trans. R. Soc. S. Africa*, 31 (1947) 389–420; maps)

THE CHRONICLE OF JEREMIAH GOLDSWAIN, ALBANY SETTLER OF 1820. Vol. I. 1819–36

Ed. by Una Long. (*Van Riebeck Soc.*, vol. 29.) 8½×5½. xxii+158 pp. Illustrations. *Cape Town*, 1946. 16s

Goldswain emigrated to the Cape in 1819. His narrative is the fullest contemporary record extant of the foundation of the Albany Settlement

AN AFRICAN ARISTOCRACY: rank among the Swazi

By Hilda Kuper. 8½×5½. 252 pp. Illustrations. *London: Oxford U.P.* (*for Internat. African Inst.*), 1947. 30s

NORTH AND SOUTH AMERICA

LA MÉTALLURGIE EN AMÉRIQUE PRE-COLOMBIENNE

By P. Rivet and H. Arsandaux. (*Trav. Inst. Ethnol., Paris*, 39 (1946) 252 pp.; maps and illustrations)

GLACIER RECESSION IN MUIR INLET, GLACIER BAY, ALASKA
By W. O. Field. (*Geogr. Rev.* 37 (1947) 369–98; map and illustrations)

RECENT AGRICULTURAL DEVELOPMENTS IN CANADA
By J. C. Robertson. (*Journ. R. Soc. Arts*, 95 (1947) 657–73)

REFORESTATION IN ONTARIO
By E. J. Zavitz. (*Canadian Geogr. Journ.* 34 (1947) 156–86)
About 200,000 acres have been replanted under various public schemes

SASKATCHEWAN
By Jim Wright. (*Canadian Geogr. Journ.* 34 (1947) 109–36; illustrations and sketch-map)

THE WELLAND CANAL
By L. and R. Harrington. (*Canadian Geogr. Journ.* 34 (1947) 203–15)

FRANCISCAN EXPLORATIONS IN CALIFORNIA
By H. I. Priestley. $9\frac{1}{2} \times 6$. 190 pp. *Glendale, Cal.: A. H. Clark Co.*, 1946. 32*s* 6*d*
Narrates the share of Franciscan missionaries in the exploration of upper California in the late eighteenth century

DRAINAGE DIVERSION IN THE ROCKY MOUNTAINS OF EAST-CENTRAL IDAHO
By A. L. Anderson. (*Journ. Geol.* 55 (1947) 61–75)

BLACK CARIBBEAN
By R. W. Thompson. $8\frac{1}{2} \times 5\frac{1}{2}$. 286 pp. Illustrations. *London: MacDonald*, 1946. 12*s* 6*d*

WHERE THE SABIÁ SINGS
By Henriqueta Chamberlain. $8 \times 5\frac{1}{2}$. 246 pp. *New York: Macmillan Co.*, 1947. 12*s* 6*d*
Described as a "partial autobiography," this is an illuminating and entertaining account of life in Brazil as seen by the daughter of American missionaries

AUSTRALASIA AND PACIFIC

NULLABOR CAVES
By J. M. Thomson. (*Walkabout, Sydney*, 13 (1947) No. 7, 29–36; illustrations)

MANUFACTURING IN NEW ZEALAND; a specific example
By H. O. Pappe. (*N.Z. Geogr.* 2 (1946) 329–44)
A study of an engineering firm in an isolated situation

THE PULSE OF THE PACIFIC
By L. A. Cotton. (*Journ. and Proc. R. Soc. N.S.W.* 80 (1946) Pt. 2, 41–76)

ARCHÉOLOGIE DU PACIFIQUE-NORD
By A. Lersi-Gourhan. (*Trav. Inst. Ethnol., Paris*, 47 (1946) 542 pp.)
A compilation of material on the interrelations of the coastal peoples of Asia and America

BOUNDARY LINES IN THE SOUTH-EAST PACIFIC
By J. M. Holmes. (*Australian Geogr.* 5 (1946) 52–7)

COCONUTS IN THE RUSSELL ISLANDS
By C. M. Davis. (*Geogr. Rev.* 37 (1947) 600–13)

GENERAL

DIE RANDSCHWELLEN DER KONTINENTE
By Otto Jessen. (*Petermann's Mitt., Ergänz.* 241 (1943) 206 pp.; maps)

AN INTRODUCTION TO PALAEONTOLOGY
By A. Morley Davies. 2nd ed., revised. $7\frac{1}{2} \times 5$. xii+372 pp. Diagrams. *London: Thomas Murby*, 1947. 18*s*

PRELUDE TO GEOLOGY
By H. H. Kent. $7\frac{1}{2} \times 5$. 120 pp. Diagrams. *London: Ernest Benn*, 1947. 6*s*
An "elementary survey of the geology of Britain, as introductory to deeper study." The author has attempted to cover a vast subject in a small book; there is little space for explanations in any detail, and the arrangement is somewhat disjointed

DIE KLIMATISCHEN GRENZEN DES ACKERBAUS
By Fritz Jaeger. (*Mém. Soc. Helvét. Sc. Nat., Zürich*, 76, No. 1 (1946) 48 pp.; *map*)

ZEMĚRIS ČLOVĚKA
By Jiří Král. 2 vols. $8\frac{1}{2} \times 6$. 302; 362 pp. Illustrations and maps. *Praha: Česká Grafická Unie*, 1945–46
The first volume of this treatise on human geography deals with man and the geographical environment; the second with man as an agent in geographical change.

MARGINAL AND INTERIOR LANDS OF THE OLD WORLD
By C. B. Fawcett. (*Geogr.* 32 (1947 1–12; sketch-maps)

ANCIENT GREEK MARINERS
By W. W. Hyde. $8\frac{1}{2} \times 5\frac{1}{2}$. xii+360 pp. Maps. *London: Cumberlege*, 1947. 21*s*

LEIÐARSTEINN: the compass of the Vikings By C. V. Sølver

The author discusses the probable methods of navigation used by the Vikings on their voyages to Greenland. He believes that they were based upon approximate latitudes by the altitude of the Pole Star and by the meridian altitude of the sun

UNRESOLVED PROBLEMS IN GEOGRAPHICAL NOMENCLATURE

By M. Aurousseau. (*Scottish Geogr. Mag.* 63 (1947) 1–10)

ATLASES AND MAPS

EUROPE

GREAT BRITAIN. Ordnance Survey. 1 : 25,000 or about $2^{1}/_{2}$ inches to 1 mile. Provisional Edition. 89 sheets. *Chessington*, 1947

ENGLAND AND WALES. Ordnance Survey. New Popular Edition One-Inch Map. Twelve sheets. *Chessington*, 1947

ENGLAND AND WALES. Geological Survey. 1 : 63,360. Drift ed. Ten sheets. *Chessington: Ordnance Survey*, 1946–47

NORTHERN IRELAND. Land Utilisation Survey. 1 : 63,360. Sheet 7, Belfast. *Lisburn: Land Utilisation Survey of N.I.*, 1947. 5*s*

NETHERLANDS. Geologische kaart 1 : 50,000. 161 sheets. *Haarlem: Geologische Stichting*, 1926–46

NORWAY 1 : 50,000. Sheet: Skjåk. *Oslo: Norges Geografiske Oppmåling*, 1944

SWEDEN. Konceptblad 1 : 50,000. Two sheets.—Generalstabens karta 1 : 100,000. Two sheets.—Generalstabens karta 1 : 200,000, Sheet 56.—Översiktskarta 1 : 400,000, Sheet 16.—Höjdkarta 1 : 500,000, Sheet 8. *Stockholm: Generalstabens Litografiska Anstalt*, 1937–46

ASIA

PALESTINE. Topocadastral Series 1 : 20,000, 157 sheets, 1941–46; Topographical Series 1 : 100,000, 16 sheets, 1944–47; 1 : 250,000, 3 sheets, 1944–46. *Jaffa: Department of Surveys*

PALESTINE. Motor Map 1 : 500,000, 1947; Palestine of the Crusades 1 : 350,000, 1944; Palestine of the Old Testament 1 : 500,000, 1946. *Jaffa: Department of Surveys*

AFRICA

AFRICA. Bartholomew's General Map 1 : 12,000,000. *Edinburgh: John Bartholomew*, 1946. *Paper* 2*s* 6*d*

ATLAS DU KATANGA. Fascicule 4, Sakabinda–Lukafu. Publié par le Comité Spécial du Katanga. *Brussels*, 1940

EGYPT 1 : 500,000. 6 sheets—1 : 100,000 Barrâmîya 2 sheets, Normal Desert Series 2 sheets, North Coast 4 sheets.—1 : 25,000 145 sheets. *El-Giza: Survey of Egypt*, 1940–46

EGYPT. Town Series 1 : 5,000. Alexandria 7 sheets; Cairo 29 sheets; Benha; Bilbeis; El Wâsta; Girga; Kafr El Zaiyât; Minûf; Minya El Qamh; Qalyûb. *El-Giza: Survey of Egypt*, 1940–46

TANGANYIKA TERRITORY 1 : 125,000. Sheets: Gua, Mlali, Mpwapwa, Namanyere. *Dar es Salaam: Department of Lands and Mines*, 1947

UNION OF SOUTH AFRICA. Geological Survey 1 : 125,000. Sheets: 119, 136. *Pretoria: Geological Survey*, 1946

NORTH AND CENTRAL AMERICA

CANADA. National Topographic Series 1 : 63,360 surveyed and reproduced by the Geographical Section, General Staff. Sheets: 31C/11, 13; 92F/3. *Ottawa: Department of National Defence*, 1947

COUNTRIES OF THE CARIBBEAN including Mexico, Central America and the West Indies. 1 : 6,000,000. *Washington: National Geographic Society*, 1947

JAMAICA 1 : 50,000. Provisional Edition. Sheets: Black River–Alligator Pond, Kingston, Lucea, Savanna La Mar. *London: Directorate of Colonial Surveys*, 1947

THE SOCIETY'S NEWS

CHRISTMAS EXHIBITION: "HIGHWAYS OF THE AIR"

From December 22 to January 15 the Society will hold an Exhibition illustrating the development of Civil Airways which should be of special interest to teachers and students of Geography. An introductory section will deal broadly with the geographical background, showing by means of globes, maps, projections, and so on the great change in geographical thought brought about by the advent of Air Power. "Air Age Education" has many advocates in the U.S.A. and specimens of American teaching material will be exhibited. A short historical section will contain scale models showing the development of civil aircraft between 1919 and 1933. This will lead on to a section illustrating present-day British and international air routes, with models of the types of aircraft flying them and of the airports in use. The underlying theme here will be the importance of London and England in the network of world air lines. The central theme of the Exhibition will be the story of the planning and operation of a civil air route and the parts played by geography, weather, economic factors, and so on. Other sections will be devoted to special subjects such as navigation, gliding and the sailplane, and future developments in the air. An Information Stall will contain specimens of airways literature, both British and American, of interest to geography teachers. The Exhibition will be open from 11 a.m. to 5 p.m. each weekday and organizers of school parties should arrange their visits as soon as possible with the Office of the Society.

APPLICATIONS FOR GRANTS IN AID OF GEOGRAPHICAL EXPLORATION AND RESEARCH

Applications to the Society for direct grants in aid of geographical exploration and research, or for recommendation to other bodies for financial support, should reach the Director and Secretary each year not later than March 31. In making application, candidates should state in some detail the scheme of research or exploration proposed, its estimated total cost, and the amount of the grant requested. They should also name any other bodies to whom similar application is being made. In the case of individual candidates not already sponsored by a scientific or educational organization, the names of two referees should be given, at least one of whom should be an authority in the particular field of research or exploration proposed.

UNIVERSITY ESSAY PRIZE

The Council of the Society is again offering this Session the annual Essay Prize of £10 for a geographical essay of not more than five thousand words. Competitors for the Prize must be registered Internal or External Students reading for Honours in Geography at one of the Universities of Great Britain and Northern Ireland during the academic year within which they submit their essay. The closing date for entries is 15 February 1948. The award will be made not later than 30 April 1948.

ANGLO-AMERICAN CONFERENCE ON GEOGRAPHICAL NOMENCLATURE

Early in September 1947 the United States Board on Geographic Names (the USBGN) expressed its willingness, through a member then in London, to send a

small delegation to hold informal discussions with the Permanent Committee on Geographical Names for British Official Use (the PCGN). A meeting was immediately arranged and five members of the USBGN arrived in London by air on October 5. Discussions with representatives of the PCGN were held in the Society's House on October 6, 7, 9, and 10. On October 8 four members of the United States delegation and the Secretary of the PCGN went to Cambridge to confer with Professor Sir Ellis H. Minns and Mr. J. M. Wordie.

The London discussions were held under the Chairmanship of Dr. Meredith F. Burrill, Director, USBGN, and Professor H. A. R. Gibb, Interim Chairman, PCGN. A memorandum of agreement between the two bodies was drawn up and is now under consideration by the full Board in Washington and the full Committee in London. It deals with the transcription and transliteration of non-Roman scripts and alphabets, the status of various forms of geographical names, the preparation of gazetteers, the possibility of economical cooperation in the treatment of problems of geographical nomenclature by the English-speaking nations, and the ultimate possibility of practical measures of agreement between all nations. If ratified by the USBGN and PCGN the memorandum of agreement will be published in due course. M. A.

ANNUAL GENERAL MEETING OF THE INSTITUTE OF NAVIGATION

The Institute of Navigation, whose inauguration on 12 March 1947 was announced in our October–December 1946 issue, held its first Annual General Meeting in the lecture hall of the Society on September 19 when the Officers and Council for the ensuing year were elected. As the result of the ballot, Sir Harold Spencer Jones, Astronomer Royal, was elected President, and Air Chief Marshal Sir John Slessor and Sir Robert Watson-Watt, Vice-Presidents. Mr. L. P. Kirwan, Director of the Society, was elected Chairman of the Executive Committee. Later the President read his inaugural address and was followed by Mr. D. H. Sadler and Captain E. Brook Williams who read papers on "The navigational work of the Nautical Almanac Office" and on "Wind statistics and their relation to air-line operation." A report of the Meeting will be included in the first number of the Institute's journal, to be published shortly.

In the half-year since its inauguration the Institute has acquired a considerable membership and has established liaison with a number of interested bodies at home and abroad. A Committee has been set up with the American Institute of Navigation under the joint chairmanship of Commodore McClintock and Sir Robert Watson-Watt to coordinate the work of the two Institutes and to encourage similar coordination with other countries. On June 25 the Institute held its first Ordinary Meeting to discuss Pressure Pattern Flying. Other meetings will be held in the new session.

Applications for membership of the Institute should be addressed to the Executive Secretary, Institute of Navigation, at The Royal Geographical Society.

GEOGRAPHY IN PUBLIC AND PREPARATORY SCHOOLS

A meeting of the Public and Preparatory Schools Section of the Geographical Association will be held at the Society's House at 3.45 p.m. on December 30. Common Entrance and Higher Certificate Geography will be discussed and all who are interested are invited to attend. The Honorary Secretary of the Section is J. W. Thompson, Bradbys, Harrow-on-the-Hill, who would be glad to hear of intending members if they are already Fellows of the Royal Geographical Society or Members of the Geographical Association.

A TOPOGRAPHICAL SURVEY

The Travel Association have recently inaugurated a new series of Information Sheets covering towns and areas of Great Britain of special interest to tourists and to holiday makers. These sheets, each of four pages, will contain a brief description of the geographical and historical setting as well as more detailed information on features of archaeological, historical, and architectural importance and on notable persons associated with the place in question. Each sheet will also include a sketch-map of the town or district, drawn by the Royal Geographical Society's draughtsmen. The sheets will cost only fourpence each and will be widely distributed for sale to the general public both inside and outside the district, the aim being to provide the essential information in a cheap and easily accessible form, unlike the average guide book. Being of a standard format, the sheets can be clipped together in a folder to form a complete record of travel.

The first batch of these information sheets, to be published shortly, will cover places of interest in southern, south-western, and eastern England and in north Wales. The information on the sheets will be compiled for the Travel Association by Mr. Edmund Vale who is also preparing notes on the method of compilation for the benefit of those interested in the topography of their own district who might wish to take part in the survey.

SUMMER VISITORS TO THE SOCIETY'S HOUSE

Between July 1 and October 20, 1124 Fellows and 610 visitors called at the Society's House. Among Fellows from abroad were Dr. Henry Field, on his way to Cairo to join the University of California's African Expedition working in the Fayum, Kenya, and South Africa; and Dr. Gilbert Grosvenor, Editor of the *National Geographic Magazine*. Among distinguished foreign visitors were Captain Åke G. Wickman, new President of the Swedish Geographical Society, and Professor Sölch, Director of the Geographical Institute of Vienna and recently appointed Rector of the University.

THE SOCIETY'S COLLECTION OF PHOTOGRAPHS

In the last number of the *Journal* (vol. 109, p. 269) we appealed for photographs of foreign countries which we could add to the Society's collection. It may assist Fellows who wish to present photographs to know that the Collection is short of photographs of all European countries, Morocco, Algeria, Tunis, Union of South Africa, India south of the Himalaya, the West Indies, and South America.

THE MONTHLY RECORD

UNIVERSITY NEWS

THE JOINT SCHOOL OF GEOGRAPHY (King's College, London, and London School of Economics)

The Joint School, disjointed during the war by the evacuation of one of its members to Bristol and of the other to Cambridge, has now had two full sessions of reunion and embarks upon the third with numbers swollen to record levels. In all, nearly 180 students are taking Geography as a major part of a Degree course in the Faculties of Arts, Science, and Economics, and for the first time in the history of the school the numbers in the Faculty of Economics taking the B.Sc. (Econ.) degree with special subject Geography have almost equalled those

in the Faculties of Arts and Science together. To these numbers may be added about 120 Colonial Government students whose work includes detailed studies in regional geography, and over 300 students taking Geography in the Intermediate Economics examination. In the post-graduate field between 20 and 30 students are working for doctorates and master's degrees. Accommodation and equipment are thus strained almost to breaking point, and no relief is obtainable for every other department of both Colleges is likewise overflowing.

The session 1946–47 was a record one, academically, for the Joint School. Four students secured First Class Honours in the London B.A. or B.Sc. examinations, and of these three have since been appointed to University teaching posts, at Exeter, Birmingham, and Aberystwyth respectively. In addition, another ex-student, who graduated in 1940, has just been appointed to University College, Nottingham.

The present session opens auspiciously with the return to King's College of Professor S. W. Wooldridge to occupy the newly-created Chair of Geography. But the School has also suffered a great loss in the appointment of Mr. W. G. East to the Chair of Geography at Birkbeck College. Professor L. Dudley Stamp, who occupies the Chair of Geography at the London School of Economics, is joint Head of the School with Professor Wooldridge; and the School thus becomes the first in the country to have two full Professors of Geography. Of the rest of the Staff, all are specialists in one field or another. At King's College, Dr. H. J. Wood specializes in North America and in Historical Geography, and Mr. W. G. V. Balchin in Physical Geography and Surveying. At the London School of Economics Mr. S. H. Beaver is Sir Ernest Cassel Reader in Economic Geography and specializes in that branch and in British Isles studies; Dr. O. H. K. Spate is Asia and Political Geography specialist, Dr. R. J. Harrison-Church on France, and Mr. R. R. Rawson is in charge of the courses followed by the Colonial Government students. Mr. F. W. Morgan (from University College, Exeter) will join the staff early in 1948.

An important new departure this session is the inauguration of a course on "Aerial photography in geographical studies" to be given by Mr. Beaver and Mr. Rawson. Stereoscopes have been provided and upwards of 1000 prints (mostly 1:10,000 scale verticals in pairs and runs, of various localities in England and Wales) have been obtained from the Air Ministry. The course is intended to provide an introduction to the use of aerial photographs in geographical work for the benefit of students who may be hoping for employment in town and country planning or who will later perhaps have a part in spreading the use of aerial photographs in school-teaching.

An amenity provided recently at L.S.E.—but only at the expense of removing the Geography Library into the main body of the British Library of Political and Economic Science which is housed in L.S.E.—is a Study Room for Finals students. This is to be known as the Rodwell Jones Room, to recall the services to the Joint School of the late Professor Rodwell Jones and of his sister, Dr. Hilda Ormsby. For the first time also, a similar room has been allocated at King's College for the use of senior students.

It would be inappropriate to close these notes without recording the deep sense of loss felt by his former colleagues on the death of Professor Ll. Rodwell Jones, who did so much, during a quarter of a century, to build and maintain the Joint School. S. H. B.

BIRKBECK COLLEGE, UNIVERSITY OF LONDON

The Geography department of this college managed to continue in action under serious difficulties during the war years when the main college building,

lying within the precincts of the City of London, suffered severely from fire-bomb raids and teaching was reduced to intensive week-end lecturing and classes. The department is now accommodated in a newly erected prefabricated structure adjacent to the college. It looks forward to its transfer a few years hence to quarters in the new Birkbeck College which is now being built on the Bloomsbury site.

Recovery from the inevitably low level of its war-time numbers has been rapid during the last two years and it is clear that the demand for evening courses for students in day-time employment, to meet which the department exists, shows no abatement. Students working for the B.Sc. (Special) and B.A. (Hons.) in Geography now number fifty, whilst another thirty-two, the majority of whom are emergency-trained teachers, are registered for the Academic Diploma in Geography. The department maintains its position as a major research centre of the University, having at present twelve students working for the M.A., M.Sc., or Ph.D. degrees within the fields of physical, historical, regional, and economic geography.

Birkbeck is probably unique in this country in having had four professorial heads of its department of Geography, all of whom are living. The first, Dr. J. F. Unstead, was succeeded (in 1928) by Dr. E. G. R. Taylor, now Emeritus Professor, who retired to fresh labours in 1944. Dr. S. W. Wooldridge during the three following sessions shouldered the difficult task of peace-time resumption of full departmental activity, and has now returned to his own college—King's—as the holder of its new Chair of Geography. The present head of the department, W. Gordon East, transferred to Birkbeck from the London School of Economics.

Of the pre-war teachers, Dr. H. C. K. Henderson returned to the department in 1946 after war service as an intelligence officer in the R.A.F. Mr. A. C. O'Dell left to take charge of the department of Geography at the University of Aberdeen, whilst Dr. E. C. Willatts holds a position of responsibility in the Ministry of Town and Country Planning. Miss E. M. J. Campbell, English corresponding editor of *Imago Mundi*, joined the department in 1941, whilst in 1947 Mr. R. T. Cornish came as lecturer with training in meteorology enhanced by his war-time experience with the Air Ministry. W. G. E.

UNIVERSITY OF BRISTOL

In 1940 the Department suffered grievous losses in buildings and equipment due to enemy action. Since that date much has been done, and is being done, to make good the losses sustained. The accommodation consists of the Lecture Theatre, two large laboratories, a spacious Seminar Room, an Office and Cartographer's Room, four private rooms for Staff, and a special room for private study set aside for Third Year Honours students. To these there has recently been added the former Senate Room of the University and this fine hall has been equipped as a Map Library. It will also house the lantern slide collection and a number of large scale relief maps and models. In addition we have in course of completion an Instrument Store Room, Dark Rooms, and a new laboratory for teaching and research in Aerial Survey and Photogrammetric work; in this last will be installed such instruments as the Stereo-comparator, the Multiplex, and the Rectifier for which a sum of £3000 was recently allocated.

The Staff at present consists of the Professor, one Grade I Lecturer, three Grade II Lecturers, and a Graduate Demonstrator. As elsewhere the numbers of students enrolled in the Department reflect the keen and growing interest in Geography. The number of students in the Department at present is 177.

Field studies were curtailed after 1940 but recommenced again in 1946 with a

class field week to the north-east of England, followed in 1947 by a field week in Pembrokeshire.

Mr. S. J. Jones has left the staff of the Department on appointment as Lecturer in charge of the newly formed Department of Geography at Dundee University College. His place here has been filled by Mr. F. G. Morris, formerly lecturer at King's College, Newcastle-upon-Tyne. Mr. J. Oliver, former graduate demonstrator, has gone to University College, Dundee, as Lecturer. Mr. G. T. Warwick has joined the staff of the Geography Department at Birmingham University. W. W. J.

QUEEN'S UNIVERSITY, BELFAST

The Department, founded in 1928, has entered a new phase this session (1947–48) with the establishment of Single Honours Schools in the Faculties of Arts and Science and a greatly increased enrolment of Honours students. These changes follow the creation of a Chair in October 1945. The combined Arts Honours School of Geography and either Economics or Economic History has been abolished, though it is still possible to combine in the Faculty of Science with Botany, Geology, or Zoology, and it is still necessary to count the first year course in Geology as the equivalent of a course in Geography. The Honours course will normally require four years.

Mr. J. M. Mogey, one of the Department's first Honours graduates and its first assistant, whose recently published 'Rural life in Northern Ireland' rounds off many years of sociological research, has left us to take up a lectureship in the University of Reading. His place has been taken by Miss J. M. Sidebotham of the University of Manchester. A newly created lectureship has not yet been filled, and adequate staffing remains a serious problem. An interesting development is the appointment of one of our graduates, Mr. Joseph Frey, to the first tutorship in Geography under the Extra-mural Department of the University, in response to a keen demand for instruction in local studies throughout the six counties.

The Geographical Association of Northern Ireland, which has its home in the Department, has issued the first inch-sheet (Belfast area) of the Land Utilisation Survey of Northern Ireland, and further sheets are approaching the stage of publication. Land use memoirs are also in preparation. The successful outcome of this undertaking is due very largely to the Director of the Survey, Mr. D. A. Hill, whose valuable labours have been recognized by the award of a Leverhulme Research Fellowship in 1946–47, renewed in 1947–48.

Queen's was less affected by war-time difficulties than British Universities. Student numbers were not seriously reduced, nor was it necessary to abandon the Easter Field Week in any year. In 1947 the area selected was South Fermanagh, where difficulties of accommodation were met by the cooperation of the Youth Hostels Association of Northern Ireland. Students are also able to obtain experience in archaeological field work and excavation during the summer months. The *Ulster Journal of Archaeology*, revived in 1938, has been maintained by the staff of the Department in cooperation with Dr. Oliver Davies, and it has been our policy to publish work on the prehistoric and historical geography of the province. Dr. Davies is shortly leaving the University to take up the Chair of Classics at Pietermaritzburg, and in consequence the future of archaeological research in Ulster, with which this Department has been closely associated, is uncertain. Members of our staff have also been active in survey work for the Belfast Council of Social Service and for the Amenities Committee of the Planning Advisory Board of Northern Ireland, and have assisted the activities of the National Trust (N.I.) and other organizations concerned with the preservation of the countryside.

We are grateful to geographers who visit us from time to time and help to break down our isolation. Last session we welcomed Professor Bao, Professor Fleure, and Dr. E. C. Willatts, and had the pleasure of a longer visit, on a research-project, from Professor John Wesley Coulter of the University of Cincinnati. E. E. E.

THE TEACHING OF SURVEYING IN THE UNIVERSITIES

The Professor of Surveying and Photogrammetry (Dr. C. A. Hart) will deliver his Inaugural Lecture on "Modern influences on the university aspect of professional training in surveying" at University College, London, Gower Street, W.C. 1, at 5.30 p.m. on Friday, 16 January 1948. The Provost, Dr. D. R. Pye, will be in the Chair and the lecturer will be introduced by Brigadier M. Hotine, C.B.E., Director of Colonial Surveys.

U.S. NAVY ANTARCTIC EXPEDITION, 1946–47

A finely illustrated article by Admiral R. E. Byrd in the *National Geographic Magazine* for October is the first detailed account available of the remarkable expedition carried out early this year under his leadership. Until the extensive material, particularly the air photographs, has been worked up, the geographical achievements cannot be adequately assessed, and this note is confined to summarizing the course of the expedition and some of its notable discoveries. The expedition was initiated and carried through by the U.S. Navy: thirteen naval vessels, under the command of Admiral R. H. Cruzen, took part in it and one of the major objects was the testing of these naval units in severe polar conditions. The main geographical aim was the aerial survey of as large a portion as possible of the antarctic coast line and of as much of the interior as was practicable. A number of scientists also carried out geological, geomagnetic, meteorological, and other investigations though their work was necessarily limited by the shortness of the time available.

The expedition was organized in three groups: the Central, with Admiral Byrd, the Western, and the Eastern. The Central, with the assistance of a naval ice-breaker, penetrated the unusually heavy pack-ice in the Ross Sea and established a base near the earlier site of Little America in the Bay of Whales, with an air strip for six ski-equipped planes which were flown in from a carrier in the Ross Sea on 29 January 1947. From this base twenty-nine operational flights were made in about two weeks of "passable, and occasionally excellent, flying weather." Of these, seventeen were successful and some 200,000 square miles were seen from the air. The planes were fitted with trimetrogon aerial cameras and extensive areas were photographed including the Bay of Whales, the front of the Ross Ice Barrier, islands in the Ross Sea and its eastern coast, and three previously unknown mountain ranges in the interior. On February 15, a day of almost perfect visibility, Admiral Byrd with two planes flew from Little America to some distance beyond the South Pole *via* the Wade glacier and the 180th meridian, the flight being completed in a little more than twelve hours. Discoveries on other flights included a glacier near Shackleton Inlet thought to be even larger than the Beardmore or the Wade, and ice-free valleys with small frozen lakes in the Victoria Land mountains. The Group was withdrawn on February 23.

The Western Group, under Captain C. A. Bond, operated in the sector west of the Balleny Islands. It was accompanied by a seaplane tender and three flying boats. The survey work was handicapped by mist, cloud, and storms, but the group succeeded in photographing some 1500 miles of this coastline. A striking discovery was a considerable ice-free area on the Queen Mary Coast behind the Shackleton Shelf Ice. Rather more than 300 square miles in extent, it contains

three open-water lakes, each over three miles in length, and numerous smaller bodies of water, the whole surrounded by ice rising in places to 400 feet. A few days after the discovery, a plane landed on one of the larger lakes: the water is said to be considerably warmer than the approximately 30° of the Antarctic ocean water. It contained quantities of green, red, and brown algae. No plants were seen on the rocks but a few birds of undetermined species were noted. In Queen Maud Land a mountain range, with estimated altitudes of over 12,000 feet and rising directly from the coast behind an extensive ice-shelf, was photographed from the air.

The Eastern Group under Captain G. J. Dufek, also accompanied by a seaplane tender and three flying boats, began operations in the Bellingshausen Sea. It encountered exceptionally stormy weather, but there and later in the Amundsen Sea and in the Alexander I Island region carried out valuable survey flights. The Kohler range with a peak estimated at 15,000 feet was relocated. To the east of the range a very large bay, or rather sea, extending some two hundred miles inland was discovered.

The detailed results of the expedition's work will be awaited with the greatest interest, for they will clearly constitute the largest single contribution to the exploration of the Antarctic, made possible by the application of the latest technical advances.

CHILEAN MISSION TO THE ANTARCTIC

An account of a Chilean mission to the Antarctic is published in the *Memorial Technico* of the Chilean Army (15 (1947) No. 58, 51–126). The authors are Major Pablo Ihl and Captain Arturo Ayala, members of the delegation from the Instituto Geografico Militar which took part in it. The mission also included representatives of the armed forces, scientists, journalists, and photographers. It will be recalled that by a presidential decree of 1940 Chile claimed sovereignty over the portion of the Antarctic continent between the meridians of 53° and 90° W. The purpose of this mission was to ratify and reinforce this claim and to carry out scientific observations. The two vessels, *Angamos* and *Iquique*, left Punta Arenas on 5 February 1947 and visited Greenwich Island, South Shetlands, where a "Casa antarctica Chilena" was established at Sovereignty Bay, then Port Lockroy, Weincke Island, and Byrd's former "East Base" at Marguerite Bay. They returned by Deception Island and Greenwich Island. At Marguerite Bay they visited the station of the Falkland Islands Dependencies Survey, and they met the Argentine Expedition at Deception Island. The mission returned to Punta Arenas on March 26. Its objects included the investigation of the methods most suitable for survey in polar conditions, clothing and equipment, and the possibilities of long-range flying. Much of this article is devoted to summaries of present knowledge and of previous exploration. There are however short descriptions of the localities visited; later numbers of the *Memorial* will contain a geographical description of the Antarctic and glaciological observations.

GEOGRAPHICAL BUREAU ESTABLISHED IN CANADA

The Canadian Government recently established a Geographical Bureau in the Department of Mines and Resources. Its purposes are to collect, organize, and make readily available geographical data on Canada and foreign countries for the use of all branches of the government. While geographical research has not been neglected by government agencies in Canada, no central organization for carrying it out has existed since the closing of the Geographic Office about twenty years ago. The new Bureau is making a collection of Canadian and foreign maps and is establishing a geographical library. Plans are being laid for the systematic

study along scientific lines of the geography of those parts of the country which are still relatively unknown. The Bureau provides a centre through which geographers and other scientists, in Canada and elsewhere, may secure information formerly only available from many separate agencies.

Dr. Trevor Lloyd, Chairman of the Department of Geography at Dartmouth College, has been granted leave of absence to organize the new Bureau and has been in Ottawa since September assembling a staff. His address is: Chief, Geographical Bureau, Department of Mines and Resources, Ottawa, Canada.

FIRST ANNUAL REPORT OF THE GERMAN HYDROGRAPHIC INSTITUTE

This 64-page booklet ('German Hydrographic Institute, Hamburg, First Annual Report, 1946,' Hamburg, 1947) published both in German and English (the former being the language of the official text) gives a good account of the provision which has been made in Germany since the war for the performance of the various tasks formerly undertaken by the organization which was the German analogue of the Hydrographic Department of the British Admiralty. Along with that account, which tells of work to do with marine surveying, the making and printing of nautical charts, the issue of nautical books, the testing of compasses, the observation and publication of magnetic values, the issue of time signals, and many other matters concerning which information is needed by mariners and by the naval side of the Allied Occupying Authority, there is substantial information bearing upon the present state of German oceanography.

Before the war, the science of oceanography had numerous practitioners in Germany and, in addition to the two well-known and very large organizations devoted to its furtherance, there were several small scientific bodies of repute which worked in the sphere. The report records how plans were laid for the employment of about one-fifth of the large number of oceanographers to work upon tasks which would serve the interests and meet the needs of that rump organization which, with the approval of the Allied Control Council, had to be set up to carry out essential hydrographical duties in German waters. These scientists ultimately became Section 2 of the Institute which is the subject of the report. Established initially by the British Naval Authorities, the Institute is now under the governance of a quadripartite Board of four Directors, functions in Hamburg, and is "managed" by the British Director who is a Captain R.N.

Considerable information is given concerning reports which have been written by various German marine scientists since the capitulation, and it is expected soon to start upon the issue of a periodical journal wherein such reports will be printed for circulation. J. N. C.

A LINGUISTIC ATLAS OF GREAT BRITAIN

Linguistic Geography, the study of language on a geographical basis, is a science which has come to stay and has proved its worth but which, alas, has so far been neglected in this country. This is the more to be regretted in that our dialects and our three languages, English, Welsh, and Gaelic, offer a picturesque variety of forms, a veritable linguistic museum, which it would be difficult to parallel elsewhere.

What exactly is a linguistic atlas? It is a collection of maps, each of which is devoted to a single word and displays the various forms and equivalents of this word in the *spoken* language of as many chosen localities as have been investigated, the precise situation of these being indicated on the map and the form in current use there printed against them. To take a very simple example: the map entitled "COW-SHED" would not only show the extent of the Welsh or Gaelic

equivalent of this word but, in the English-speaking areas, would reveal where the "standard" form is in common use and where its two main rivals, the northern and western *Shippen* and the north-country and Scottish *Byre*, still hold sway. The map would thus reveal, in the English-speaking part of the country, three broad linguistic zones, the unity and distribution of which are the result of social and historical factors that the linguistic geographer will endeavour to explain. The maps of other words, "CHILD" for example, would present a far more variegated pattern, especially in Scotland, and lead consequently to a much more detailed historical or social interpretation. On it would appear the *kids*, the *bairns*, the *weans*, the *littlans*, the *geets*, etc., and it would be seen that these are not scattered haphazard throughout the land but form coherent areas, dependent upon some regional centre from which linguistic influence radiates or has radiated in the past, and separated sometimes by some geographical feature, sometimes by some ancient administrative boundary line of which, as often as not, this local linguistic frontier is the sole remaining vestige.

We do not dwell upon the number and variety of the specially linguistic problems which any map may present, the solution of which is frequently perplexing and always instructive to the philologist. Suffice it to say that the Linguistic Atlas of France by Gillieron and Edmont, the first of its kind, created such a revolution in philological method and brought such enlightenment that since it appeared some fifty years ago nearly all the nations of Western Europe and the United States of America have followed or are following the French example. It was high time that we should do the same. It is therefore a pleasure to be able to state that a scheme is afoot, sponsored by the Philological Society of London, to remedy at last our long default. Unless our country is thoroughly down and out, funds should not be lacking to bring the scheme to fruition. JOHN ORR.

PEAK OF VICTORY

We reproduce opposite and overleaf two views in the Central Tian Shan showing the recently-named Pik Pobedy (Peak of Victory), discovered by Soviet explorers in 1943. The peak, which stands 16 kilometres south of Khan-Tengri (42° 12′ N, 80° 10′ E), is 7440 metres high and thus not only the highest point in the whole Tian Shan system but also the second highest in the U.S.S.R., exceeded only by Peak Stalin (7495 metres) in the Pamirs. Determining the exact height of the peak was a considerable undertaking, involving the establishment of a system of geodetic stations which were subsequently the basis of a detailed topographical survey of the area. Unfortunately we have been unable to obtain sheets of this survey or even coordinates for the peak so that its exact position is not yet known to us.

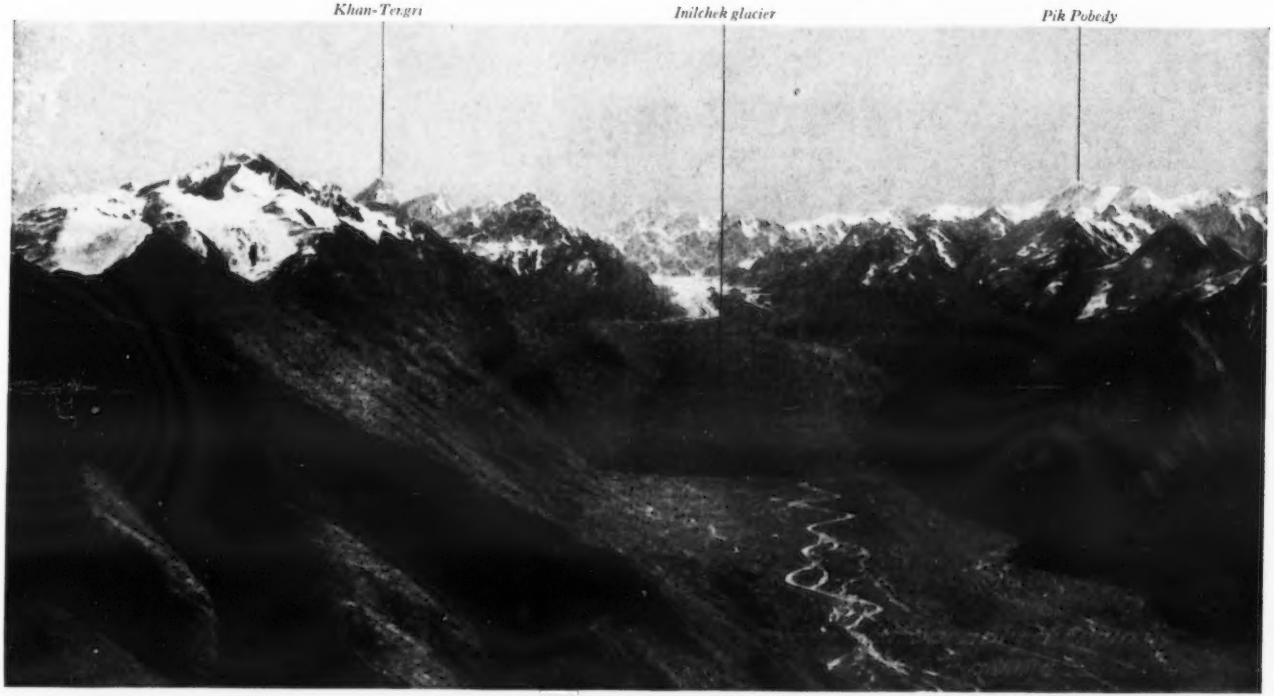
NATIONAL PARKS AND THE CONSERVATION OF NATURE

The recent publication of Command Paper No. 7121 (Report of the National Parks Committee) and Command Paper No. 7122 (Report of the Wild Life Conservation Special Committee), presented by the Minister of Town and Country Planning to Parliament, marks a very important step towards the goal of National Parks and Nature Conservation in England and Wales.

The wider public interest will naturally be focused on the proposals set forth in the report of the National Parks Committee. After a very full discussion of the history, need, and purpose of the national park movement, the Committee recommend the establishment of twelve major National Parks embracing the greater part of the most attractive scenic areas in the country, together with fifty-two smaller "Conservation Areas." The setting up of a National Parks Commission is advised and in it would be vested control of all future develop-

Phot. V. Ratsek, supplied by S. I. B. Photoservice

View in the central Tian Shan from the north, at 4000 metres



Phot. V. Ratsek, supplied by S. I. B. Photoservice

Central Tian Shan from Sari-Jas (4200 metres)

ment within the specified areas: a management policy is outlined to preserve the main characteristics of the existing landscape and balance of life, and the early clearance of untidy dumps, shacks, and other erections out of harmony with the natural landscape is strongly recommended. A somewhat looser form of control working through local authorities is envisaged for the Conservation Areas. Paradoxically, one of the chief obstacles to the creation of some of the parks may be the activities of certain Government departments which at present are exempt from statutory planning control. Powers of compulsory acquisition are vested in a number of these departments (more especially the Defence Ministries) and conflicting claims to the use of the land will doubtless need decisions at Cabinet level.

Command Paper No. 7122 deals with the Conservation of Nature in England and Wales and will appeal mainly to scientists. The general problem of wild life conservation is admirably discussed and the need for biological, geological, and physiographical reserves is clearly shown. The alarming deterioration of our national heritage in this respect is very evident and the Committee recommends the creation of a "Biological Service" to take charge and care of type Scientific Areas (of which 35 are listed), Nature Reserves (73 listed), and Geological Monuments (42 listed). It is also envisaged that the Biological Service itself would actively engage in research work.

The financial implications of the proposals put forward in each paper seem modest in comparison with the present rate of national expenditure. It is however unfortunate that the reports appear at a time of financial stringency: it will be recollected that the Addison Committee report on National Parks (Cmd. No. 3851), published in 1931, coincided with a financial crisis and the urgency of its recommendations was not realized. Now however there exists the Minister of Town and Country Planning, responsible for the appointment of the present committees, who may be expected to act upon their recommendations at the earliest opportunity. Meanwhile it is to be hoped that both reports will be widely read. They are fully illustrated with maps and all the areas specified are described: each National Park has an appreciation and the features of interest in each Scientific Area, Nature Reserve, and Geological Monument are fully indicated. More local knowledge of our national heritage would doubtless help to save many of the sites which it is hoped to preserve. A letter to *The Times* or to the preservation societies has often been the means of rescuing some feature in danger of obliteration: far too many others have disappeared through local ignorance. W. G. V. B.

MAP SERVICE OF THE NATIONAL GEOGRAPHIC SOCIETY

We have received through the courtesy of the President, Dr. Gilbert Grosvenor, an interesting publication of the National Geographic Society. In this Dr. Grosvenor describes the considerable contribution of the Society's Cartographic department to the war effort and Mr. Wellman Chamberlin discusses the problem of projections with particular reference to the maps published by the Society.

After describing the general methods employed in the production of the maps, Dr. Grosvenor gives many examples of the use to which they were put during the war. The U.S. War Department requisitioned more than one million sheets, including 100,000 copies of the Society's map of China; the Army Air Force borrowed the original drawings of the map of Japan and made 5000 enlargements and the Corps of Engineers similarly prepared 20,000 enlargements of "Germany and its approaches." Individual high-ranking officers also used the Society's maps for a variety of purposes: a complete set in a special cabinet was used by

President Roosevelt, who presented a similar case to Mr. Winston Churchill at Christmas, 1943.

The title of Mr. Chamberlin's monograph, "The round earth on flat paper: map projections used by geographers" indicates its scope and treatment. It is written for the ordinary user of maps as far as possible in non-technical language and without mathematical expositions, and sets forth clearly the methods of construction, advantages and disadvantages of the main classes of projections. The treatment of the effect of the projection on the scale of the resulting map and of the "equal area" problem is noteworthy. The text is accompanied by a great number of clear and informative diagrams by Mr. C. E. Riddiford. Of particular interest is the discussion of the reasons for the choice of projections used in the Society's maps. The projections have been very varied, and include the stereographic for the Atlantic Ocean, the azimuthal equal-area for the eastern and western hemispheres and the azimuthal equidistant for Japan. Two unusual projections are an equal-area polyconic devised for South America by the late A. H. Bumstead, based on 5° strips on a conical projection with two standard parallels, and C. H. Deetz's oblique polyconic used for the map of Asia.

CORRESPONDENCE

ETYMOLOGY OF SOME AFRICAN NAMES

In the *Journal* for January–March 1947, Colonel Clifford's note on "Recording native place names" (pp. 99–102), using as an illustration the technique of recent Boundary Commissions in North-East Africa, is timely, useful, and full of sound sense. Notably Stanley, who did not pretend to be linguistically equipped, was accused of being misled by inadequate interpreters into recording as place-names the various African language-forms of "don't know." In many areas of Africa, the recording of a whole-course name to a river presents a special difficulty where, for instance, the attitude of the local inhabitants consists in questioning the utility of giving a standing name to water which runs away, carrying off its name with it! Such peoples are apt to regard it as a waste of words to affix, to running water, a fleeting name. In communities which seldom move from a restricted area, and among geographically-intact clans who remain on their mountain or in their forest (virtually and voluntarily *glebae adscripti*) overlooking flowing water, the succession of names downstream from the source often only reflects in their customary daily parlance, in a succession of very varied local riverain languages, words signifying (I'm off to) ***the spring***, ***the brook***, ***the rivulet***, ***the stream***, ***the river***, and so on. Stanley's famous Aruwimi, opening out and slowing down from the overshadowed swift afforested river Ituri, is probably only *Big*, almost-*standing* or sunny, *water* in the local Zandé-type dialect. [(B)*a-ru-himé*: *Ba*, "father of" (*Big*), *ru* or *uru*, "outstanding" or "sunny" (*open*), *himé* (*water*)]. In the vast Zandé language-area of Africa (in Belgian Congo, Nilotic Sudan, and French Equatoria) place-names have been hard to fix to villages. They bear their chief's name during his lifetime, and change name or location at his death.

On page 211 of the *Journal* for October–December 1946, Mr. Hicks on "The Portal Peaks of Ruwenzori" aptly refers to "Ruwenzori, the inaccessible, *rain-filled* Mountains of the Moon." The "operating" word is *rain-filled*. It may seem to some that the more southerly Birunga volcanoes (that is, the east-west cross-

Rift range of the "Mufumbiro" in the Bufumbira), which leap to the eye as resembling mountains in the moon and feed both Lakes Victoria and Edward, may be regarded as answering more probably to the classical story of the Mountains of the Moon as a Nile-source from a time (*c.* 450 B.C.) when there was knowledge of the Nile beyond Egypt for "a distance of four months' travel by land and water." (*τεσσάρων μηνῶν, πλόου καὶ ὁδοῦ, γινώσκεται ὁ Νειλος πάρεξ τοῦ ἐν Αἰγύπτῳ ῥεύματος*: Herodotus, 'Histories.') But, however that may be, "rain-filled" is both meteorologically and etymologically correct. The Rwe-nzóri (with its understood agreeing-prefix of *Ru-shozi*, mount) *ru-enzúra*, of rain, constitutes the 16,800-foot hills to which the equatorial peoples of the plains lift parched eyes and from which cometh their help in the form of rains, or snow-fed rivers, at all seasons. By the more distant open-country peoples who do not consciously feel their daily life or climatic conditions to be influenced by the mountain, which they normally only glimpse at certain seasons when the cloud-cap momentarily ceases to obscure its snowy summit at dawn, it is more commonly known as *Gambalágala*. Etymologically the most likely root signifies "glisten," thus "the glistener." To the forest-peoples of the western slope, it is more commonly and colloquially known as "The Old Man" or just "The Mountain."

While on such a subject, may I venture to submit another kindred point alleged to have a geographical background? In the Belgian Congo, the administration and its local representatives are familiarly and normally known as "the Bula Matári" or, literally, "break stones." The Belgians inherited the sobriquet from the Americanized Stanley (born British John Rowland) who, after the British and American refusals, offered the Congo and his "title" to the far-seeing king of the Belgians. In the three Congos, nicknames are habitually given by Africans to Europeans soon after their entry into circulation in Africa. Customarily, nicknames are given by reason of a salient trait of character rather than because of any isolated incident. In so far as one may judge from those of Stanley's Africans with whom I have talked of it in their own tongues (his cook-boy became my old cook in 1920), the nickname *Bula Matári* was not conferred on Stanley in admiration. This Bantu nickname, by Europeans later interpreted as a compliment, constitutes Stanley's sole epitaph on the rough stone which marks his grave in the English village churchyard where he lies buried. Stanley is commonly alleged to have been by Africans nicknamed "Break Stone" from his use once of dynamite on rock, and the name passed for being derived from a geographical incident (Louis Franck, 'Le Congo Belge'). That however is not the whole story. Penetrating up the river Congo or Zaire, above the limit of ocean navigation at Matadi (etym. *mátalé* or *mátaré* signifying limonite rock), near Vivi where the Congo is in cataract breaking through the marginal Monts de Cristal towards the sea, Stanley "set [the Africans] to work crushing rocks on the river bank with a sledge [hammer]. What did it matter to Stanley whether the souls of negroes were saved? Was it not he who, with conqueror's fist and the white man's gun, put the negroes to flight?" (Ludwig, 'Stanley.')

In whatever sense Stanley's pet phrase-and-order "*bula mataré*," "break stones," was used, and whatever "his" Africans may have meant it to mean as a nickname for the man who was forcing the door into their country, it did not of course, in a material sense, diminish the scientific value of Stanley's addition to Europe's knowledge of geography. The Africans' usual penetrating instinct for labelling a European's salient characteristic, such as an angry and habitual order to "break stones," would in this case rather signify, for Africans, the character of a slave-driver, intruder, destroyer, or revolutionary. Nor indeed is this interpretation of this nickname anything new in this part of Africa.

'The history of the kingdom of Congo' (Pigafetta, Rome, 1591) relates mainly to the neighbouring African Christian kingdom (whose capital was at San Salvador) and to Africans akin to those who nicknamed Stanley. The History records the story of the African king's relation, the African bishop, and of his revolutionary relative "Dom Francisco *Bulla Mataré*, that is to say, 'catch stone' . . . and so *the devil*, by means of this man, *opened the door* for the *destruction* (of the temple of christianity) in that kingdom" (emphasis added). The destructive, deprecatory, or sinister sense of the nickname "bulla mataré" is here apparent. It is hardly necessary to add that the present-day stereotyped application of this nickname to the Belgian colonial administration, which has inherited it automatically, carries now no pejorative implication whatsoever. TRACY PHILIPPS.

13 *August* 1947.

THE KURIA MURIA ISLANDS

Sir Rupert Hay, in his interesting account of his visit to the Kuria Muria Islands (*Geogr. J.* 109 (1947) 279), remarks that it is not known how they came by their English name. Though its original derivation is a matter for conjecture, it is in fact a variant spelling of Curia Muria, the Portuguese version of the Khurian Murian of medieval Arab geography. The islands are often mentioned by the Portuguese historians: Almeida in his 'Historia de Ethiopia a alta ou Abassia' gives a little-known description of them in connection with two Jesuit fathers, Antonio de Montserrat and the famous Pedro Paez, who spent six or seven days there in January 1589. The islands, he says, are ten leagues from the mainland. The Jesuits "disembarked on one which is called Suadiê, near which is another called Hazquiê. They are all small and inhabited by very poor people. They cover their houses with the weed that the sea throws up on the shore; they live on fish, which is never lacking, but they have no wood with which to boil or roast it, so they eat it raw, first drying it in the wind. It seems that the sea casts up amber there in plenty as they offered a large quantity to the fathers for little money." (Beccari, 'Rerum Aethiopicarum Scriptores Occidentales,' vol. 6, p. 8.)

The islanders who told Sir Rupert Hay that their real language was Shihri, and that it was the same as that spoken by the people of Murbat, must have meant the language usually called Shahari by English, and Šhauri by German scholars. It is now spoken chiefly by the troglodyte tribes of the Qamr and Qara mountains. It is interesting that it should have been called Shihri. The modern Shihr is, of course, an Arabic-speaking town far to the west, but in the time of Idrisi the islands were subject to the Sultan of Shihr and he still controlled Dhufar in the time of Paez, who became his prisoner. Local tradition identifies the old city of Dhufar with the modern Murbat. Idrisi observes that the islanders speak "the ancient language of the people of 'Ad, which the Arabs do not understand." The modern name of this language derives from the Shahara tribe which claims descent from Shaddad son of 'Ad. C. F. BECKINGHAM.

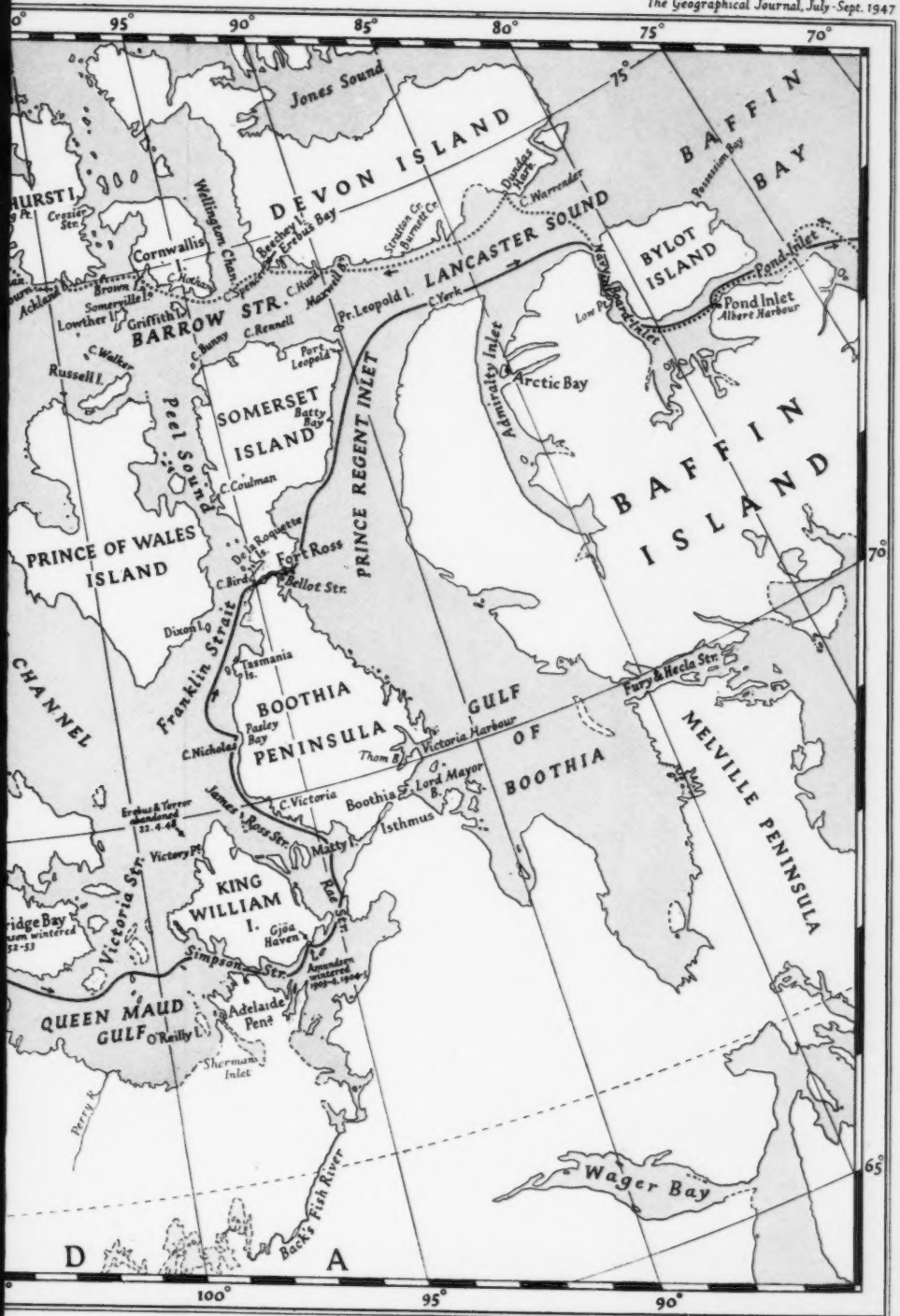
4 *November* 1947.

Published January 1948

THE NORTH WEST PASSAGE : Map to accompany the paper

Published by the Royal Geographical Society

by Inspector H.A.Larsen R.C.M.P.



NORTH WEST PASSAGE
Larsen